BULLETIN

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THE JOHNS HOPKINS HOSPITAL

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CONTENTS.

	PAGE
Opening of the Surgical Building and New Clinical Amphitheatre of the Johns Hopkins Hospital,	379
Multiple Primary Carcinomata of the Ileum. By C. H. Bunting, M. D.,	389
A New Office Irrigating Stand. By George Walker, M. D.,	394
Concerning a Case of Suppurative Myositis Caused by Micrococcus Gonorrhœæ (Neisser). By Norman MacLeod Harris, M. B., (Tor.), and Louis W. Haskell, Jr., M. D.,	395
Bacterium Cyaneum: A New Chromogenic Organism. By Ethel L. Leonard, M. D.,	398
Notes on New Books,	400
Index	402

OPENING OF THE SURGICAL BUILDING AND NEW CLINICAL AMPHITHEATRE OF THE JOHNS HOPKINS HOSPITAL.

A large audience, composed largely of members of the medical profession from Baltimore, the State of Maryland, Washington, Philadelphia, New York, Boston and other cities, was present at the opening of the surgical building and clinical amphitheatre upon Wednesday, October 5, 1904, at 11 A. M.

Dr. W. H. Welch presided and introduced Hon. H. D. Harlan, the President of the Board of Trustees of the Hospital, who spoke as follows:

It is my pleasant duty on behalf of the Trustees to welcome you to the simple ceremonies attendant upon the formal opening of this new building, devoted to clinical medicine and surgery. We are much gratified at the number of our friends who have assembled. We make our special acknowledgments to the distinguished physicians and surgeons, pathologists, and other masters in the world of medical science, who have journeyed from afar, and particularly to those who have consented to deliver addresses on this occasion. That so many have done us the honor to accept our invitation is evidence (if any be needed), that the work of the Johns Hopkins Hospital and Medical School is not unknown or unappreciated either at home or abroad.

At the time of the death of Johns Hopkins, on Christmas Eve, 1873, there was no Johns Hopkins Hospital, although there was a corporation which Mr. Hopkins had caused to be formed during his life, and a board of trustees carefully selected by him, who were engaged in gathering information and in making plans not only for the buildings which were to be erected on this site, but also for the organization of a medical staff and the equipment and operation of the institution they were to bring into existence.

The task which was set for these trustees was one of great responsibility; and, while a large latitude of discretion was vested in them, they were not left wholly without guidance as to the intentions of the founder. In a letter of instructions written in 1873, he had, among other things, said, (1) "that they were to provide for a Hospital, which, in construction and arrangement, should compare favorably with any other institution of like character in this country or in Europe," and (2) "that it should be their special duty to secure, for the service of the Hospital, surgeons and physicians of the highest character and greatest skill."

These directions have ever been borne in mind by the Trustees. We may speak to-day of the wisdom and forethought, the sagacity and prudence, of the charter Trustees and their successors during the formative age of the Hospital without any self-glorification, because not one of the original Trustees still lives, the two last survivors having died in quick succession during the past summer—much beloved and much regretted by their associates; and because, with the single exception of Mr. George W. Corner, to whom all honor is due for his long and faithful service, extending over more than

twenty-nine years, not one of the present Board was in office when the Hospital was dedicated in 1889, and only one when the Medical School was opened in 1893.

How well the earlier Trustees fulfilled the trust reposed in them with reference to the construction of the Hospital is indicated "by the international reputation of the Hospital as a model of hygienic construction, by the influence it has had upon the building of later hospitals, and by the conspicuous place which the plans of the Hospital occupy in recent treatises devoted to the discussion of the methods and problems of hospital construction."

How successful they were in their plan for the organization of the medical staff of the Hospital and the selection of its members the brilliant record of the work of this staff during the past fifteen years will attest. These years have been years of marvellous advance in medical science and research everywhere; and that the members of the staff of the Johns Hopkins Hospital and Medical School have contributed, to speak with moderation, in a marked degree to this advance is universally admitted. If proof were required of the proud position they occupy, it could be furnished by the action of that venerable seat of learning, Oxford University, in coming to the Johns Hopkins Hospital to take away, much to our regret, our Dr. Osler to make him its Regius Professor of Medicine.

One cannot contemplate the growth of this institution, its far-reaching influence, the results accomplished in the brief space of thirty years since Mr. Hopkins died, without a kindling of the soul and without being profoundly impressed with the thought that he was right in his belief that his wealth was given to him for a great purpose, and that this purpose he discovered, and that it is being grandly accomplished.

The relation of the Johns Hopkins Hospital to the Medical School was determined by the founder of both in these words: "In all your arrangements in relation to this Hospital you will bear constantly in mind that it is my wish and purpose that the institution shall ultimately form a part of the Medical School of that University for which I have made ample provision by my will."

The Trustees have sedulously endeavored to follow this injunction. They have kept it in mind in the construction of the Hospital, designing it with special reference to its uses for higher medical education and research; in the organization of the medical staff, making the professors and teachers in the Medical School their chief officers and advisers; in the liberal policy they have adopted in supplying means for original investigation, and in supporting the Hospital publications for the dissemination of the knowledge here gained.

This building is the latest product of the recognition by the Trustees of the obligation imposed upon them by the founder towards the Medical School and medical education. The growth of the classes in medicine and surgery demanded enlarged clinical accommodations, and for some time the necessity of securing better facilities for the surgical work of the Hospital has been brought to the attention of the Trustees. This building is intended to furnish these accommodations and to provide all the facilities necessary for the most modern surgical work.

I beg that, as you examine it, you will note how much of it is devoted to teaching purposes. The plans were prepared by an accomplished architect of our city, Mr. George Archer, who has had a large experience in hospital construction, under the direction of the Superintendent and Mr. Charles F. Mayer, the Chairman of the Building Committee, and with many consultations with the chief of every department for whose use it was intended. We believe the result obtained will be highly satisfactory, and, like the other buildings at the time of their construction, it will, as the founder wished, compare favorably with any other of like character in this country or in Europe. It is cause for sincere regret that Mr. Mayer, who gave to the details of the plan so much of his time and who was so deeply interested in its construction, has not lived to see its completion. We hope that this building will mark a new era in the advance and work of the Hospital.

The present year has been full of vicissitudes in the affairs of this institution. Five of its oldest, most active and useful Trustees have been removed by death. In the early part of January, we were shocked by the sudden death of Mr. John E. Hurst, long a member of the Finance Committee of the Board. The embers of the great fire had scarcely ceased to smolder when the unexpected death of Mr. Mayer, the Chairman of the Building Committee, occurred, at a time when we most needed his services. In August, the sad news come from the north, where he was recuperating, of the death of Mr. William T. Dixon, who had held the position of President of this Board for a period of eleven years, and had only retired from it, as we hoped, temporarily until his health should be restored. He had hardly been laid in his grave when an end came to the life of Mr. Lewis N. Hopkins, who had served the University and the Hospital as Secretary of their respective Boards for many years; and early in September, Mr. Francis White, a member of every important committee of the Board, the trusted friend of Johns Hopkins, and the last survivor of the Trustees selected by him, expired. All of these were deeply interested in the Hospital's welfare and gave of their time and experience to its service without stint and with the most self-sacrificing devotion. Their fidelity to the duty they had undertaken is an inspiring example to their successors.

Our fiscal year had hardly opened when the great conflagration which devastated the business center of the city destroyed sixty-four warehouses, stores and office buildings belonging to the Hospital, and we were suddenly brought face to face with a loss of income of sixty thousand dollars a year, arising from the cutting off of the rentals of these properties, and a loss of endowment of about three hundred and eighty thousand dollars.

Great anxiety was felt lest it should become necessary to curtail the work of the Hospital. No note of encouragement came to us which touched us more deeply than offers from members of the medical staff and nurses to remit their salaries. Fortunately our anxiety was relieved by the liber-

ality of Mr. John D. Rockefeller, who, after having thoroughly familiarized himself with the work and management of this institution, placed at the disposal of the Trustees five hundred thousand dollars to repair the fire losses and to enable them to go on with its work without diminution. We were and are profoundly grateful for this timely aid. The state also came to our assistance in this time of distress, and the legislature appropriated twenty thousand dollars a year for two years as an offset to our loss of income.

With this help the work of the Hospital has gone steadily forward and the Trustees have taken resolute hold of the situation arising out of its properties in the burned district. Already buildings are in course of construction, some approaching completion, or plans are prepared for rebuilding, on more than half of its sixty-four lots. Some have been disposed of to advantage, and we trust that, as a result of the liberality of Mr. Rockefeller and the generosity of the state, the fire may prove after all not to have been a misfortune.

The Trustees have many problems to face. Not the least difficult of these is the necessity for an increase in the endowment of the Hospital to enable it to grow and develop and occupy the field that lies open to hand. Additional wards are needed to accommodate a larger number of poor patients and to afford greater clinical facilities for the Medical School. A new Children's Ward is required. The Nurses' Home should be enlarged to provide quarters for the increase of nurses made necessary by the growth of the Hospital. The pathological laboratories must be increased in size to meet the increase of students in that important department.

The investments of the Hospital's endowment have been watched with the greatest care, and, while there has been some shifting of values, the net result is, that the endowment, received from the executors of Johns Hopkins' will, remains unimpaired, but rates of interest are diminishing, and the growth of the work in every department has been so phenomenal that the expenses of the Hospital are constantly increasing.

How are we to meet them? This will soon become a pressing question. But we face the future with good courage, confident that this great charity, this Hospital, with its glorious past history, its present opportunities and future prospects, will not be allowed to languish; and as lately in our hour of need a benefactor was found, so in the days that are fast approaching, others, who are seeking to employ well the wealth with which they have been blessed for the largest benefit of mankind, will recognize the claims of the Johns Hopkins Hospital and the Medical School.

Dr. W. S. Halsted was introduced and gave a brief account of the educational aims of the building and dwelt especially upon the facilities which it would afford for the teaching of surgery.

Dr. Lewis A. Stimson, of New York, Professor of Surgery in Cornell University, then delivered the following address:

It is a great privilege to be permitted to take part in the opening of this building, a building devoted to the surgical relief of suffering and to the advancement of the art and science of that relief.

In that collocation of terms, sanctioned and sanctified by long usage, the art is named first, and with good reason. The science long had scant title to be named. We have the authority of no less a master of science and the scientific method than Huxley for the statement that they are practically the product of the century that has just ended; and what is true of science in general is much more true of the science of surgery. That has been created within our own times. Half of the men now living and practicing surgery have seen its birth and all its growth. In that creation the men connected with this University have borne a worthy part, and to its advancement a notable part of this building is devoted, a signal recognition not only of the importance of that scientific work, but also of the labors and successes of those who have here done it in the past, and who in doing it have added so much to the honor and the renown of the University.

Heretofore that work has been carried on without a specific equipment for the purpose, and this building is a recognition by the Hospital Trustees of the value and importance of the work, of their confidence in those who have carried it on, and of the need of observation, experience, and experiment for the proper advance of the science and the improvement and extension of the art.

It must be gratifying to those under whose direction this great University has won so pre-eminent a place to reflect that its surgical division, so widely known and so highly honored as it is, is in fact its own child, that its personnel is of its own upbringing and development, that its reputation and its honor are the crown of its own methods and labors. Before the medical department was established he who is now the head of the surgical division was studying and working in the pathological laboratory which so wisely had been made the foundation-stone of the complete structure which was to follow. And when a head was sought for the new division, a surgeon for the Hospital and an incumbent for the new chair of surgery, he was found within your own walls, trained in your own methods, imbued with your own ideas, working in full harmony with his associates. His success was immediate and has been continuous. Into the details of Professor Halsted's work and success the time is not now ours to enter, great as they have been, interesting and stimulating as the story would be. It must suffice, here and now, to say that his work has been characterized by industry, thoroughness, an accurate scientific method, and great originality. In everything he has wrought he has stepped out from the beaten path and opened new lines. Uncontrolled by tradition and established practice he has not been content to perfect accepted methods, but he has gone back to underlying principles, and upon that sure foundation has developed ideas and procedures which have been illuminating in their effect upon practice. He has shown the courage of conviction based upon thorough investi-

gation, and in the carrying out of his ideas he has protected his patients by an accurate and exhaustive technique to which his own contributions have been most valuable and are now universally accepted. And under him has appeared here, presumably as the result of his influence and example, a corps of junior officers whose work is everywhere acknowledged to be of the greatest value in itself and of rich promise for the future.

Although in the world of science all men are kin, and the teaching ranks of one university freely draw upon and are in turn drawn upon by others as the need of enlargement or repair arises, yet the possession of such an adjuvant and reserve force as you have here created gives a most comforting assurance of your ability to carry on your work not only with unbroken continuity but also almost unchecked even by such a grievous loss as the one you have just sustained and in which we all share. Surely it will be permitted to me to pause for a moment to speak just one word in recognition of all that has been done by him who is leaving you, for medical science and the renown of your University and in appreciation of the personal qualities which have so endeared him to all, and to wish the fullest measure of opportunity and happiness in his new field to your departing colleague, Professor Osler.

The revolution effected in the practice of surgery in the last three decades is known to everyone. It has been coincident with and dependent upon the creation and development of a new science, that of bacteriology, and it has been carried to such perfection in detail and technique that it would hardly be thought unreasonable to say that so far as regards the treatment of the wound made by the surgeons no important additional advance is to be anticipated. The surgeon to-day divides almost any tissue, opens any cavity, exposes any region of the body with the confident anticipation that the injury he inflicts will be promptly repaired without danger or permanent loss to his patient.

This has, of course, enormously extended the field of operative surgery, has brought within the range of relief and cure conditions before which our art formerly stood helpless, and by substituting early inspection during life for tardy inspection after death, it has taught us to recognize disease while still it is relievable, to anticipate and prevent disaster, and to write the natural history of processes of which formerly we knew only the ultimate term.

The story is too familiar to permit more than a reference to it in this gathering. Our minds turn instead to the future. We ask in what directions will this laboratory increase our knowledge, and what errors, what exaggerations, if any, what defects of their qualities have grown out of our past progress to interfere with the welfare of those who are to occupy these wards.

Some of these problems of the future are concerned with the incompleteness, the occasional failures, of the knowledge already acquired and the methods already established. Others deal with new material.

Among the latter the most prominent perhaps is that of the origin and nature of the malignant neoplasms, of cancer, in a word. After making all allowance for possible error by defective records or faulty diagnosis, it seems unquestionable that the importance of this subject is daily increasing through increasing frequency of occurrence and through the gradual extension of the disease to periods of life which have heretofore appeared almost immune. The deaths by cancer, in its various forms, now constitute one of the largest groups in our mortality records. We have indeed made some gain in its treatment. We remove it earlier and we remove it more thoroughly; and we can show not only a delay in recurrence, but also a much greater escape from it. And for this, in one of the most prevalent forms of the disease, and voicing, I am sure, the opinion of the whole profession, we have to thank the clear insight, the courage, and the technical skill of Professor Halsted. But we still remain ignorant of the nature and the cause of this disease, powerless to prevent its appearance or to arrest its development, able only somewhat better to do for it what has been done for centuries.

And this although many observers have long been actively engaged in its investigation. That its origin in a germ should be suspected was of course inevitable, and not only because of the extent to which the germ theory of disease has occupied our minds and the many cases in which it has been proved, but also because of prominent features in the life history of the disease which seemed to show a close analogy with other diseases in which such causation was fully recognized, and of the prospect of gain to the sufferer which such a discovery would open. But the search has thus far been inconclusive, and at present the line of investigation which seems to hold out the best promise is that of physiological chemistry, in the hope that it may disclose some quality in the growth utilizable in the treatment, or in the nature of a toxin produced by it, the effects of which may be successfully combated. Thus far we can say little more than that differences from the normal in the proteids of the growth, and from inflammation in the form of cell-division (Farmer) have been demonstrated. The extension of the study to tumors in the lower animals, notably by the English observers and by Moran and Jensen, together with the success of attempts to transplant, justifies the expectation that a much more thorough investigation by experiment is possible. and the hope that our knowledge of the essential nature of the cell-process may thereby be increased.

The value of the X-rays in treatment, too, is yet to be measured; meanwhile they have shown that the vital resistance of the morbid cells to them is less than that of the normal cells, and thus is suggested a possibly fruitful line of investigation.

The remaining problems in wound-infection and sepsis, notwithstanding the enormous gains that have been made, are still of very great importance and complexity. Speaking broadly, we may say that our technique in the treatment of fresh wounds is established and that our success in the prevention of their infection is assured. But yet we still have our failures, even our disasters, therein; and in the wide field of wounds infected before they come to us, of patients

already septic through one cause or another, our power to save is still sadly restricted. So long as the fight against the bacillus can be waged outside the body it can be won; but when once a lodgment within the body has been effected the bactericidal agents upon which we elsewhere rely with so much confidence cannot always be effectively employed.

The natural history of the micro-organisms has long been studied ardently and successfully, and our knowledge of them is now sufficient to make us their master under ordinary conditions, and our technique competent to protect our wounds. We do not, and cannot, prevent all access of bacteria, but we can and habitually do limit the number of those which enter to an amount with which the tissues of our patients are usually able successfully to deal. What we do not know, and what we gravely need to know, are those conditions in our patient which nullify the bactericidal power of his tissues and transform them into a soil favorable to the rapid growth and multiplication of specific micro-organisms, to recognize such conditions beforehand if possible, and to combat them successfully. When the infection is comparatively mild, when it remains for a time measurably local, we can usually overcome it by measures analogous to those which we employ to prevent infection; but when it is violent, when the entire organism is acutely involved, we are comparatively helpless.

Serum therapy, which has done so much good in allied conditions, has proved ineffectual here. The bacilli of septic infection differ greatly from those others in the products they form, in their action upon the tissues, and in their reaction to remedial agents. The diphtheria bacillus, for example, kills by a toxin which it produces in a localized growth. Under cultivation outside the body it produces an abundant diffusible toxin which in turn when introduced into an animal produces an abundant antitoxin, and that antitoxin introduced into the patient neutralizes the toxin there produced by the bacillus and thus saves the patient's life; and as this neutralization is effected, so the bacilli cease to multiply and soon disappear.

In septicæmia, on the other hand, the micro-organisms rapidly invade all parts of the body and kill not solely by a poison of their own production but by one which results from the combined action of the bacterial and tissue cells. To arrest this process it is not sufficient, so far as we know, to neutralize the poison; the bacilli themselves must first be destroyed. In some allied infections this destruction of the micro-organism can be accomplished by an antitoxin obtained from the blood of an immunized animal aided by a complementary body normally found in the blood of the patient. But the animal immunized against the streptococcus produces the corresponding antitoxin in only very scant quantities, and it finds the necessary complementary body only in the blood of animals of the same species. The serum of the immunized rabbit will protect or cure another rabbit; it is practically powerless in man. Even the complementary body found normally in man diminishes in sepsis almost to the point of disappearance, and thus is created another gap in the necessary chain.

Furthermore, the toxic effect of the streptococcus varies within so wide limits for the same culture that we must infer an explanatory difference in the resistance of the tissues of the individual, a difference the cause of which is only in part known or conjectured. Under the term "resistance" is of course to be included the capacity of the organism promptly and effectively to rid itself of the poisons manufactured within it by the bacilli, or possibly by the tissue cells under influences which bring about a perversion of metabolism. Illustrative examples can be found by every surgeon in his own experience. A simple, almost minor, operation which suggests no thought of danger is followed by the rapid development of a high temperature and early death with no evidence of more infection than would ordinarily be easily overcome. Or in another, less simple, less free from infection, a general condition promptly supervenes which indicates a fatal arrest of the eliminatory, or a grave alteration of some intermediate function. The habitual gravity of puerperal sepsis can hardly be fairly attributed to the virulence of the infecting streptococcus; it suggests rather a change in the soil, a change presumably dependent upon the entrance of the organism upon the function of gestation; and the grave modification or the arrest of the function of the liver or the kidney under the action of agents that can affect it only mediately through the nervous system shows a delicacy of balance which should impose upon us a watchful reserve in those classes of cases in which interference has shown itself most likely to affect it.

And how shall we explain, and how guard our patients against those overwhelming intoxications which occur so promptly when tissues have been *half* killed, when the circulation still goes on through them?

Studies of cell ferments show the possibility of sudden and complete inhibition or reversal of function of the ferments in the internal organs, and the detailed study of the nitrogenous excretion may reasonably be expected to lead to a clearer understanding of the cases and possibly to prevention or cure.

Such cases can be thoroughly worked up only by the collaboration of experts in several branches. They need not only the clinician and the pathologist, but also the bacteriologist and the physiological chemist; and such collaboration can hardly be provided by a hospital which is not connected with a well-equipped institution of learning. It is, however, practicable here, and such is now your opportunity. The work that has been so well done in the past is a guarantee that your enlarged opportunities will be appreciated and utilized.

In these instances of problems awaiting solution which have been mentioned the functions of the laboratory are mainly concerned, and it is but natural that so marked a step for the advancement of our science, so notable a provision for the sound establishment and furtherance of our art as its creation should attract attention. But we do not forget that it has been created and that it will be maintained by you for the benefit of suffering humanity, and that in the adjoining wards, in the work of the clinician, is to be found the reason for the existence of the laboratory, the end and the object of

the work to be done in it. The observation which does not lead to the reduction of physical ill, the promotion of health, the relief of suffering, has no right to be deemed a part of medical science. The laboratory is the handmaiden of the ward, and its achievements must be controlled and tested by the clinician and must derive their final crown of honor from the use which he can make of them.

And while it is his correlative duty to suggest lines of investigation and to familiarize himself with what is there gained, he remembers that this is but one of the many sources from which he must draw aid and information, one of the many fields which his vision must survey, and that he himself must supply much of the material for and indicate many of the lines of investigation. And rich and brilliant as the clinical record of the past is in advances made and obstacles overcome by the aid of the laboratory, it contains also many an equally notable one accomplished entirely within its own field, many a valuable addition or supplement to the results of laboratory research, or explanation of what there remained obscure. Let me briefly recall in illustration the work done by one man in one disease.

Is there any disease to-day more widely known, more banal, than appendicitis? Its occurrence is so frequent, its recognition is so easy, its treatment is so successful that the conception of its danger has slipped into the background, and the surgeon's interest in it has even become a part of the stock in trade of the professional humorist. And yet, less than two decades ago it was known clinically as a disease that was generally fatal, and known pathologically only in its late, its most advanced form, and even there but incompletely known and with no conception, clinical or pathological, of the common mode of origin and of the means of recognition in the stage in which it is now habitually met and overcome. The profession spoke of, and the books described as separate and distinct affections, typhlitis or cæcitis, cæcal retention, perityphlitis, paratyphlitis, gangrene or perforation of the appendix, acute idiopathic peritonitis, and intestinal obstruction, with no grasp, without even a suspicion of the causal relation which makes them all parts of one nosological entity, and they disputed only from time to time whether the perityphlitic abscess was extra- or intra-peritoneal. The treatment was limited to opium and expectation, to be followed, if the patient survived long enough, by a surgical evacuation of the abscess if that could be accomplished without an exposure of the peritoneum to what was deemed an inevitably fatal contact with its contents.

In the remarkable paper read by Dr. Reginald Fitz before the Association of American Physicians in 1886, in which the word appendicitis was, I believe, first spoken and which did so much not only to call attention to the subject but also to clear the way to a full understanding and a rational and successful treatment, conditions of the appendix which we now know to be the consequences of the disease were spoken of as causal conditions, and in the discussion which followed he said "So impressed have I been with the obscurity of the signs of incipient inflammation of the appendix that no attempt has been made to consider the process until there was evidence that perforation had taken place."

Too much praise, too hearty a recognition cannot be given to this paper which deserves always to hold a high place in our grateful remembrance. It was written by a physician for physicians, but it clearly showed the surgical need and opportunity and commanded the surgical attention which so promptly followed and which furnished the information needed to complete our knowledge and to establish a successful method of treatment, and which, it should also be noted, added so much to the development of the surgery of the abdomen and to our understanding of the pathology of inflammations of the peritoneal cavity.

About a year after the publication of Dr. Fitz's paper, Dr. Sands did the first operation for the prompt relief of a perforation of the appendix into the abdominal cavity and reported it in a paper which, while containing some current erroneous conceptions, pointed out in the clear and trenchant manner so characteristic of that great surgeon the surgical need and opportunity in that class of cases and the manner in which they could be properly met.

In the few months of life which remained to him Dr. Sands actively pursued the study of the subject in conjunction with Dr. McBurney, who immediately succeeded him as surgeon of Roosevelt Hospital, a position which during his incumbency became the most influential center of surgical teaching in New York. His clinics were frequented by men already in practice, and this added largely in the rapid spread of his opinions through the medical community. Opportunity multiplied rapidly and its first fruit appeared in a paper read by Dr. McBurney before the New York Surgical Society in November, 1889 (N. Y. Medical Journal, December 21, 1889), followed a year later by another on the "Indications for Early Laparotomy in Appendicitis" read before the Medical Society of the State of New York in February, 1891.

In these papers, based wholly on clinical experience, Dr. McBurney gave what was essentially a complete picture of the disease in its pathology, course, symptoms, and treatment. Synthesis was substituted for differentiation, and the widely different conditions previously subjected to separate consideration were brought together under one rubric and shown to be diverging developments of processes originating in a common cause. The great frequency of this initiatory condition was demonstrated, and the means by which it could be readily and surely recognized and safely and efficiently treated before it had progressed to those perilous conditions in which alone it had previously been recognized, were described in detail with the support of a large and successful experience. He showed not only that the means of recognition of the early condition were so accurate as fully to justify anticipation of its rapid and dangerous progress and to demand active treatment, but also that the treatment recommended, the immediate removal of the affected organ, was vastly safer than expectation, even if the comparison included the mild cases which recover unaided within a few days.

It was shown also that the same plan of treatment, incision directly into the abdominal cavity, was also the best for the later and the intermediate stages, that even as a means of exploration to determine the presence or absence of pus, upon which operative interference had previously stood waiting on the brink, it was safer than the exploratory needle puncture which had previously been employed, and that it also offered the safest means of treating the abscess if one should be found. His cases showed that pus could be safely evacuated across the peritoneal cavity, that its contact with the peritoneum was less dangerous than the prolongation of its retention beside it while awaiting its progress toward the surface or its spontaneous opening into the bowel, and that, finally, in the latest stages, the same free incision held out the best chance of recovery by the drainage and the relief of tension which it supplied.

A little later he devised a method of operating which preserved the full strength of the abdominal wall and thus removed an objection to the early and possibly avoidable operation which had been urged with some persistence and force.

It is not easy for one who did not work in the antecedent period to appreciate the vast relief that came from this simplification of the problem, from the easy and early recognition of the disease and from the removal of the doubts and hesitation which embarrassed treatment. The relief was immediate and widespread and was felt even more by the physician than by the surgeon. It has wrought inestimable good, and the story, which well deserves to be told at much greater length than is here permissible, is a constant stimulus to thorough, intelligent, and conscientious labor.

Finally, in the future, it seems to me, the part of operative surgery will be somewhat lessened, at least relatively. I trust it will not be misunderstood if I say that in some respects we might be compared to one whose position has been changed by an unexpected inheritance from poverty to affluence, and who does not at first fully grasp the limitations or the responsibilities of wealth. We suddenly found ourselves able to do with great safety things which previously had carried great risk, a risk which often was prohibitive. It was natural, and proper, that that gain in our resources should be pushed to the utmost, that we should enjoy all that it could properly give, and that its limitations should be established by experience. To that first exuberance, to the feeling that any operation might properly be undertaken because the wound would heal kindly, is succeeding a more reserved attitude. We appreciate that even if a wound heals well, the tissue that has been repaired after our cutting is not always as sound as if it had not been put in need of repair. To the hopeful expansion of the frontiers of our operative interference is succeeding the less dramatic but equally useful elaboration and perfectioning of what has been acquired, and the recognition of the conditions and limitations of the advance. We hear less often the argument "He will surely die if we do nothing; let us therefore operate." We appreciate that of two evils it is a less one that our patient should die of his disease than that he should die of our attempt to cure him. Our exploratory work, too, is more closely restricted to obtaining only such information as can be utilized in treatment, and less is done which though harmless is also without benefit. There is so much necessary and legitimate operating to be done that we are freed from the insidious temptation to add to our numerical record and spurred to improve our results.

The future is rich in promise that is almost within our grasp, promise of advance in our science and promise of help to those who are in need of our art. And to you who have builded and to you who are to make use of what has been built, I wish a hearty Godspeed in the illustrious and beneficent work which lies before you and of which your past offers so sound a guarantee.

Dr. T. Clifford Allbutt, Regius Professor of Physic at the University of Cambridge, England, after congratulating the Hospital upon the erection of a building which promised to do much to advance clinical teaching, spoke briefly of the relations of medicine and surgery.

Dr. A. Jacobi, of New York, spoke as follows:

I am not here to sail under a false flag. Dr. Welch has just said that I have been a teacher of his, but for two dozen years at least he has been so to me, as well as to the profession of the United States and of Europe. Now, statistics prove that provincials have a tendency to crowd into centers. No wonder then that I, like the wise men of the East, come at this time to the shrine of Johns Hopkins. In appreciation of that fact your good and great men have consented to give me an opportunity to prove that I am not a good extemporaneous speaker. Indeed words fail me to express my feeling at such an occasion as this. There is no necessity for me to repeat what the new buildings that have been inaugurated to-day stand for. They will do a great deal for medicine, a great deal for Johns Hopkins, and a great deal for the world of science through the Johns Hopkins. Through the Johns Hopkins I say, for in the last quarter of a century, indeed even in less time, Johns Hopkins has succeeded in proving itself one of the head centers of the world and of science. It has largely contributed to the rapid changes that have taken place in medicine. Up to half a century ago it was an art only. It has since developed into art and science, and grown not only in its theories, but also in practice and usefulness. That is what Cicero meant when he said that all our glory was of no use unless what we did was useful, and also our own Benjamin Franklin, who claimed that all philosophy was useless unless it could be put to some use in the interest of mankind. That was the way Rudolph Virchow looked at medicine and at science in general. Many of you were present thirteen years ago when his seventieth birthday was celebrated in this very Johns Hopkins. At that time we learned a great deal about that great man whom some of us had not known. He was really a

greater man than Aristotle for Aristotle with all his gifts and accomplishments, was only a great naturalist. He was a greater man than was von Haller, for Haller knowing everything knowable did not have the immense horizon of Virchow. I like to speak of Virchow, because he has been my example and he has been that example to all those who now live and those that will come after us as one of the greatest men, not only in medicine, but in man's history. He saw, like Sokrates and Kant, the future welfare of mankind in medicine. He created the best in general and special science that Johns Hopkins stands for.

As a pathologist he elucidated the cause and seat of illness. As a therapeutist, acknowledging that we are in a new era of therapy, he believed in drugs, but more in schools, education, culture, good roads, industry, and all the demands and blessings of democracy. He was the apostle of sanitation and prevention, and promoted the hygiene, physical, moral and mental—of the individual, the city, the state and mankind. As a humanitarian he claimed that the physician was the attorney of the rich and poor alike, and the guardian of all social problems. As a statesman he found no trifle too small, no great aim inaccessible. To him it was as important a law to help, as to fight one another.

We cannot all be Virchows. But next to accomplishing a great goal, comes the earnest wish to accomplish it. The best the young medical men of the nation can do is attempt it. There is much to do in every direction. Do not forget illness is not confined to individuals; human society is still abnormal and diseased. There must be remedies for them all. Though the best of us be more or less impotent, we should be aware that there must be means to reach every reasonable end. Cure and prevention are required for the individual and for mankind. There is no better way to them than through medicine. That is what I wish I could impress upon the minds of you, the young men to whom the future belongs with all its privileges and responsibilities. And I know of no better way to medicine than through Johns Hopkins.

I am glad to be here to participate in these exercises, as a deeply interested listener, to congratulate the teachers upon having greater facilities to instruct, the students upon their improved opportunities to learn, and the city of Baltimore upon the new glory in store for it. With all that, I have to thank those who have established these institutions for this new foundation by which they have added new accommodations for the sick, rich and poor, and a benefaction to mankind.

Dr. D. C. Gilman, ex-President of the Johns Hopkins University, was introduced by Prof. Welch as the first Director of the Hospital, he having held that position upon the organization and opening of the Hospital in May, 1889.

Dr. Gilman humorously acknowledged the introductory remarks of Dr. Welch, and then called attention to three points which might be emphasized at the close of this hour:

First, we should remember that it was the munificence of one person, a lady now present, which enabled the Johns Hopkins authorities to establish this Medical School. After years of waiting for the lack of sufficient funds, she made possible what many had hoped for. In her presence I will not venture to say all that would be appropriate under other circumstances, but I am sure you will gladly be reminded that it was a great, untrammeled and generous gift from Miss Mary E. Garrett, which initiated this school of medicine and prepared the way for the rich fruits of medical skill and knowledge which have been rehearsed by the speakers before me. (Applause.)

Next, let me remind you that the good results which have here been attained, results that are good not only for the sufferers here relieved, but for suffering humanity everywhere, these results have been reached by the harmonious co-operation of three institutions, the University, the Hospital, and the Medical School. I do not know where you can find an exact parallel to this union.

The University from its inception laid its plans for the encouragement of those branches of natural science, physics, chemistry and biology which underlie the science of medicine and in other ways it upheld the ideal of broad liberal culture. Then came the Hospital so finely endowed, so admirably arranged, so well administered, and so well manned by distinguished physicians and surgeons. Then came the Medical School. These three sisters may be likened to the ancient statue with which you are familiar, three Graces with arms intertwined and hands locked. Neither one without the other could accomplish so much.

Third, after all the key to the success of this institution, has been the maintenance of lofty ideals from the very beginning. When Dr. Welch was here alone, when he was joined by Dr. Osler and Dr. Halsted, and soon afterward by Dr. Kelly, all the way through, the loftiest ideals have been upheld. I believe they always will be while the spirit of Dr. Hurd and President Remsen pervades these institutions Look at Boston, New York, Philadelphia, Cleveland, Chicago, California, and other centers of medical science and hospital practice, and you will find in all these places young men trained under the teachers here assembled. Their knowledge has gone out to all the world. Even the University of Oxford comes to Baltimore for a torch-bearer.

Finally, let me remind you that it is the individual student who goes out from among us who shows what this institution is. We are soon to unveil a memorial to Lazear, dear Lazear, who sacrificed his life for the good of mankind, and not long hence, in Washington, another Johns Hopkins man is to be honored by a great memorial, Major Walter Reed. If this University, if this Medical School, if this Hospital had produced these two men only it would be worth all the cost. Young men, emulate their examples. Live up to the lofty ideals brought before you by your teachers, the great and the wise, the learned and the skillful.

After an inspection of the buildings a luncheon was served at 1.30 P. M. in the Administration Building, and at 3 P. M. the audience reassembled in the clinical amphitheatre to witness the unveiling of a tablet to Dr. Jesse W. Lazear, a former officer of the Johns Hopkins Hospital, who died in Cuba of yellow fever in 1900.

Dr. William Osler presided and spoke as follows:

It has been well said that Milton's poem Lycidas touches the high-water mark of English poetry; I do not know but that it may be said the high-water mark of all poetry. This is true not only because the poem appeals to us by its intrinsic merit and worth, but because it touches that chord in each one of us which responds at the personal loss of some young man to whom we had become attached. Those of us who have got on in years mourn many young fellows whom we have seen stricken by our sides. We have had in this Hospital fortunately only a few such losses. We have lost on the medical side Meredith Reese, Oppenheimer and Ochsner, and we have also lost a man of rare worth, in whose memory we meet to-day, whose story will be told you by Dr. Carroll and Dr. Thayer, Jesse William Lazear, a Baltimore boy, a Hopkins graduate of the Academic Department, a graduate of Columbia University in Medicine and a resident physician of this Hospital, the first man to take charge of our clinical laboratory, who, in Cuba, sacrificed his life in the cause of humanity.

Assistant Surgeon James Carroll, representing the United States Army Medical Corps, was then introduced and spoke as follows:

As a member of the Army Medical Department and a former associate of Dr. Jesse W. Lazear, I am proud to join you in honoring the memory of one to whom the State of Maryland, the Johns Hopkins University and the United States Army may point with genuine pride and affection. Acting Assistant Surgeon Lazear was the first person to produce an undoubted case of experimental yellow fever with the mosquito and it was he who first worked out the key to our present knowledge that we can control this devastating disease which has been justly designated the plague of the American continent.

Because of his previous experience while working with Dr. William Sidney Thayer, in the study of malaria-transmitting mosquitoes, Dr. Lazear was chosen to conduct the first mosquito experiments of the Army Yellow Fever Board, and as the result of his own individual work he enjoyed the satisfaction of producing the two first authentic cases of experimental yellow fever on record. Then with a full knowledge of the power of the insect to convey the disease, he afterwards calmly permitted a stray mosquito that had alighted upon his hand in a yellow fever ward, to take its fill, and inject into his system the virus that twelve days later robbed him of his life. About a month prior to this he had deliberately applied to his person with negative result another mosquito of the genus Stegomyia that had bitten a yellow fever patient ten days before. It is true that in the present instance he did not think the insect belonged to the genus that had been shown to convey the disease, but who could say at that time that more than one genus would not convey it? He made no attempt to capture or preserve the mosquito nor did he make any record of the fact that he was bitten, nevertheless the fact remains that he deliberately submitted to the bite, and accepted all the chances that went with it, whether of infection with yellow fever, filariasis or what not. As soon, however, as the nature of his infection was established he at once appreciated the significance of the bite to which he had submitted; he then related the circumstance to me, emphasizing his belief that the insect was not a *Culex fasciatus*, but, as he expressed it, "a common ordinary brown mosquito," in which the hospital at that time abounded. This statement is not so surprising if we remember that the markings of different Stegomyiæ of the same species may vary greatly in their distinctness, and that some of the wards of Las Animas Hospital were heavily shaded by foliage and were very dark, especially in the corners, where some of the beds were located. Under such conditions the markings of an old insect might readily escape observation.

It is very sad for those who knew Dr. Lazear to contemplate the loss to his family and to the profession, of one so true, so energetic, so gifted, so well equipped and so ambitious, but thanks to the efforts of his friends in this University his memory will be preserved by the handsome and fitting memorial dedicated to him to-day and his achievement will stand as a monumental stimulus to other young men, who will have imbibed their hunger for knowledge from the same fount as he, and who will go forth imbued with the same intense desire to relieve suffering and to acquire further knowledge for the benefit of the human race. The value to the United States alone of the work that he began can be estimated in millions and I hope the time is not far distant when the beautiful city of Havana will display a suitable monument to him who accomplished the first step in proving Dr. Finlay's theory of the transmission of yellow fever by the mosquito, and who laid down his life in the actual prosecution of that work.

At the time the Army Board met on the 26th of June, 1900, Dr. Lazear had been on the Island several months, and during that time he had fearlessly visited and studied a number of cases of yellow fever both during life and after death, not in the army alone, but among the civil population as well. He had taken many cultures at autopsies and had studied many films of blood, stained and unstained, so that he was already able to say with confidence that cultures and blood examinations promised nothing of unusual interest.

Dr. Lazear was indefatigable and his labors were frequently prolonged into the night in the little cottage where he lived alone in happy anticipation of a visit from his beloved wife and family. Owing to the strict quarantine that was maintained, there were but few cases of yellow fever at

Columbia Barracks and it was necessary for him to visit Las Animas Hospital, about five miles distant, in the suburbs of the city of Havana. It was here, while applying mosquitoes to a patient, that he received the fatal bite on September 13, 1900. Five days later on the evening of September 18, at eight and eleven o'clock P. M., he suffered two chills and was found in bed with fever next morning. I examined his blood for malarial parasites twice on the 18th and again on the morning of the 19th, each time with negative result. This, together with the clinical symptoms, made the diagnosing fairly conclusive, and in accordance with the custom he was then removed to the yellow fever isolation camp. Before his removal he turned over to me his notes covering all the attempts at mosquito inoculation and told me of his own experience of which he had made no record. For three days he barely held his own, then the gravity of his symptoms increased, black vomit supervened, he became delirious, and death closed the scene one week from the day of onset.

Thus ended a life of brilliant promise at the early age of thirty-four. Dr. Lazear died in order that his fellow-men might live in happiness and comfort. We know that only last year, when one thousand cases of yellow fever occurred in Texas, the scenes of 1878 would have been repeated in the South but for the work that was begun by him. It is no exaggeration to say that hundreds, nay perhaps thousands, in the southern states to-day unconsciously owe their lives, certainly their prosperity, to the results of the work in which he was engaged and for which he and his family have paid such a fearful penalty. The world lost in him a benefactor; the profession a man of high attainments, noble character and lovable disposition; words cannot measure the loss to his widow and orphans, the younger of whom he had never seen.

This grand University will always be proud of Lazear, whose name will forever be associated with that of Reed in the history of the transmission of yellow fever.

Dr. William S. Thayer then said:

As we meet to-day to dedicate this plate to the memory of our dear colleague, it seems but yesterday that Lazear told me of his desire to make use of the advantages which service in Cuba offered for the study of malaria and other tropical diseases and of the opportunities which had been held out to him by authorities of the army. It was, indeed, but five years ago. But in another sense how far away that time seems. For, as it ever is with truly great discoveries, the blessings of which are immediately appreciated by all mankind, certainty and enlightenment soon dull the memory of the groping past and we almost forget that the time ever was when this knowledge was not ours. And if we estimate the length of his life by the results which he helped to achieve, the day that Lazear left for Cuba was, truly, long ago, and the few months which remained for him to live, measure up to a riper lifetime than that which lies before many of us more fortunate to-day in the eyes of the world.

Of the four names connected with the noble work of the Yellow Fever Commission, two were of men who were students, associates or comrades of those of us who remember the Johns Hopkins Hospital fourteen years ago. Alas, neither is with us to-day! Both Reed and Lazear worked in these laboratories and wards, walked these corridors and lived under this roof, and both were deservedly loved by their colleagues and friends. It is not for me to-day to speak of Reed of whose simple, noble, upright character, of whose fine qualities and achievements you all know, but I would say a few words of Lazear as a man and a friend. Born near Baltimore, where his mother still lives, Lazear graduated from the Academic Department of the Johns Hopkins University. Studying medicine at Columbia, he afterwards served two years at the Bellevue Hospital in New York. After the term of his hospital service he spent a year in Europe, in part at the Pasteur Institute in Paris, after which he served a year as bacteriologist to the medical staff of this Hospital. In 1896 he married and began the practice of medicine in Baltimore. Holding the position of assistant in clinical microscopy in the University, much of his time was spent in research work in the clinical laboratory. During his interneship he had succeeded, for the first time, in isolating the diplococcus of Neisser in pure culture from the circulating blood in a case of ulcerative endocarditis. The three years which followed were devoted mainly to the study of questions concerning the malarial parasites. Lazear was the first in this country to confirm and elaborate the studies of Romanovsky and others concerning the intimate structure of the hæmatozoa of malaria, work appearing unfortunately some time after its accomplishment and, indeed, after his death. He was, with Wooley and myself, the first in this country to partly confirm the work of Ross and the Italians on the mosquito cycle of the malarial parasites. These studies in particular fitted him for the work which the Yellow Fever Commission was to undertake in Cuba, and the part which he played in that work was essential and important. But of this Dr. Carroll has already spoken.

I wish, especially for the younger men here, that I might be able to picture to you Lazear as a man and a companion. Quiet, retiring and modest, almost to a fault, he was yet essentially a manly man with a good, vigorous temper, well controlled, and rare physical courage. He was one who made his own plans and worked out his own problems; with a deep love of his profession and an ardent desire to make adequate contributions to its advance. He always seemed to me a man of promise, and but a few weeks before his death, I had warmly recommended him for the vacant chair of medicine in a northern university.

When the news of his cruel death became known, there were those who blamed what they regarded as unjustified temerity, who felt that such risks were not for married men. With this I cannot agree. No man loved his family more than Lazear; but he was engaged in a great work—and he knew it—in a work where at the moment no substitute could

take his place. Lazear saw his duty clearly and where he saw his duty fear and doubt could not enter in.

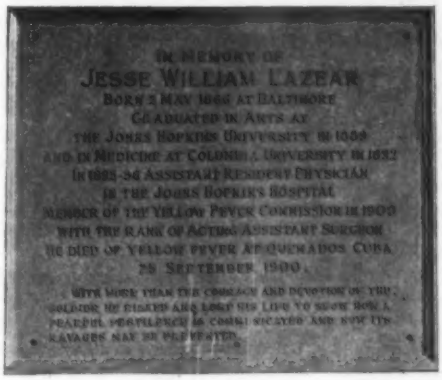
A few well-known lines of Emerson tell the whole story:

> "Though love repine, and reason chafe,
> There came a voice without reply,
> 'Tis man's perdition to be safe,
> When for the truth he ought to die.'"

It was that voice which guided Lazear as it has guided in the past and will guide in the future many a good and brave man.

(The tablet was then unveiled.)

I may add a few words about the history of this plate. Shortly after Dr. Lazear's death many of his friends wished to have a fitting memorial for him in some way connected with this Hospital with which he had been identified, and subscriptions were asked for a fund. We had no thought of collecting a large sum of money but in a very short time nearly twenty-five hundred dollars were subscribed. With a small part of this sum this plate has been secured while the rest constitutes a fund for the benefit of the children of Dr. Lazear. Foremost in the movement for collecting this fund was Dr. Stewart Paton, who regrets, I know, very deeply that he may not be here to-day. The inscription upon this plate was written by President Eliot of Harvard University.


IN MEMORY OF
JESSE WILLIAM LAZEAR
BORN 2 MAY 1866 AT BALTIMORE
GRADUATED IN ARTS AT
THE JOHNS HOPKINS UNIVERSITY IN 1889
AND IN MEDICINE AT COLUMBIA UNIVERSITY IN 1892
IN 1893-94 ASSISTANT RESIDENT PHYSICIAN
IN THE JOHNS HOPKINS HOSPITAL
MEMBER OF THE YELLOW FEVER COMMISSION IN 1900
WITH THE RANK OF ACTING ASSISTANT SURGEON
HE DIED OF YELLOW FEVER AT QUEMADOS CUBA
25 SEPTEMBER 1900
WITH MORE THAN THE COURAGE AND DEVOTION OF THE
SOLDIER HE DARED AND LOST HIS LIFE TO SHOW HOW A
FEARFUL PESTILENCE IS CONTRACTED AND HOW ITS
RAVAGES MAY BE PREVENTED

MULTIPLE PRIMARY CARCINOMATA OF THE ILEUM.

BY C. H. BUNTING, M. D.,

Instructor in Pathology, Johns Hopkins University.

Carcinoma of the small intestine is a comparatively rare lesion. Of the whole extent of the alimentary tract the jejunum and ileum form the part least affected by new growths. This statement is well borne out by several sets of statistics. Nothnagel,[1] in his analysis of the material from the Allgemeines Krankenhaus in Vienna from 1870 to 1893, found 243 intestinal carcinomata, of which but 10 were of the ileum. Leichtenstern[2] found 780 intestinal carcinomata distributed as follows: 17 duodenal, 3 of middle ileum, 13 of the lower ileum, 9 of the ileo-cæcal valves, 3 of the appendix, 20 of the cæcum, 6 of the ascending, 30 of the transverse and 11 of the descending colon, 42 of the sigmoid flexure and 616 of the rectum. Lubarsch[3] records from the Pathological Institute in Breslau 24 rectal carcinomata, 14 of the colon, 2 of the duodenum, 1 of the middle and 1 of the lower ileum, and at the time of the publication of his article (1888) could find but 35 cases of primary carcinoma of the ileum recorded in literature. In the first 2200 post-mortem examinations in the pathological department of the Johns Hopkins Hospital there have been 104 carcinomata of the alimentary tract, exclusive of the buccal cavity, which have been distributed as follows: of the œsophagus, 12; of the stomach, 60; of the duodenum, 3; of the ileum, 1 (the case reported below); of the cæcum, 22; of the colon, 18; of the rectum, 8.

The small intestine from the entrance of the common duct in the duodenum to Meckel's diverticulum in the lower ileum is a simple unbranched tube, without variation in its type of lining epithelium, without sharp bends, without diverticula and containing, as a rule, in health semi-fluid mechanically non-irritating material. The infrequent occurrence of malignant new growths in a tube of such a nature is the negative evidence which allows of the generalization, from the positive evidence afforded by the other sections of the digestive tract, that carcinomata are most prone to arise where there are changes in the type of lining epithelium and at points where the surface is most liable to mechanical irritation. Further evidence is added by such cases of carcinomata of the small intestine as those reported by Waldeyer[4] and by Birch-Hirschfeld,[5] in which the new growth has arisen at a point where peritoneal adhesions have interfered with the normal action of the intestine.

The neoplasm in the case here reported is published not solely because of its location in the middle segment of the ileum, but also because of the multiplicity of the primary lesion and of the histological nature of the growth. The case came to autopsy in the service of Dr. Welch at the Johns Hopkins Hospital from the medical service of Dr. Osler.

The patient, Columbus D., hospital number 44,573, a negro aged 52 was admitted October 31, 1903, complaining of symptoms referable to broken cardiac compensation. Physical examination showed the P. M. I. of the heart to be in the V l. i. s. 14 cm. from

[1] Specielle Path. u. Therapie, vol. xvii, p. 308.
[2] Ziemssen's Handbuch, vol. vii, p. 523.
[3] Virchow's Archiv, 1888, vol. cxi, p. 280.
[4] Virchow's Archiv, 1872, vol. lv, p. 67.
[5] Lehrbuch der Path., p. 918.

the midsternal line, where it was feeble and irregular. On auscultation the sounds were feeble and irregular at the apex, the first accompanied by a soft murmur. Otherwise the examination was negative. Blood examination showed red blood corpuscles 4,480,000, white blood corpuscles 7,900, hæmoglobin 65 per cent. The patient died 5 hours after admission and his condition was such that no accurate history could be obtained, however the notes obtained from his wife give no evidence that the intestinal lesions found post mortem, had given rise to any noticeable symptoms during life.

The autopsy was performed by the writer, November 1, the protcol being as follows:

The body is that of a well built colored man, 165 cm. in length. The pupils are equal. Rigor mortis is present. The abdominal cavity appears normal.

Thorax.—There are quite firm old adhesions in the left pleural cavity. The right side is practically free from adhesions. The pericardium shows a slight excess of fluid.

Heart.—The heart is large. The pulmonary artery contains fluid blood and soft clot. The right auricle is dilated. The tricuspid valve seems normal. Its orifice is apparently dilated and measures 14 cm. The pulmonary valves are delicate and normal and measure 8 cm. There is some hypertrophy of the right ventricular wall, which averages 4 mm. in thickness. There are hypertrophy and dilatation of the left auricle. The mitral orifice admits three fingers and measures 10.7 cm. There is slight thickening of the free edge of the valve. The chordæ tendineæ appear shortened. The aortic valves are thickened. The aortic orifice measures 7 cm. There is considerable sclerosis at the base of the aorta. There is but one coronary orifice which lies above the left anterior segment of the aortic valve, and is the orifice of both the coronary arteries. The right coronary is covered at this point by thick patches of sclerosis in the aorta. The heart muscle is very soft. On tangential section the muscle is pale and cloudy, showing scattered yellow areas. The papillary muscles show transverse yellow striations and on section besides a definitely yellowish musculature show translucent greyish areas which are firm and apparently fibrous.

Lungs.—The left lung shows old adhesions over the upper lobe. The surface is quite deeply pigmented. The lung appears air-containing throughout. The cut section is rather moist and congested. There appear to be no areas of consolidation throughout the lung. The right lung is quite similar to the left. The bronchi are free. The mucous membrane is slightly injected, otherwise it appears normal. There are no ante-mortem clots in the pulmonary arteries.

Spleen.—The spleen weighs 80 gms. and measures $10 \times 7 \times 3$ cm. It is small. The capsule is opaque and greyish-purple in color, thickened and wrinkled. The trabeculæ are thickened, and stand out prominently. The vessels stand open. The Malpighian corpuscles are increased in size.

Liver.—Weighs 1200 gms. and measures $22.5 \times 18.5 \times 6.5$ cm. The liver is rather small. The surface is smooth throughout. The edge is sharp. The cut section shows congestion of the central veins. The lobules are sharply marked out and appear to have a normal color. The gall-bladder appears normal. The bile ducts are patent.

Kidneys.—The left kidney measures $11.3 \times 6.2 \times 4$ cm. The capsule strips easily, leaving a smooth regular surface and the cut section shows a cortex about normal in width, and of a good color. The vessels are much injected. The glomeruli are prominent. The right kidney resembles the left.

Stomach.—The stomach appears normal.

Pancreas.—The pancreas appears normal.

Intestine.—The intestines show in the upper part of the ileum, six nodular structures varying in diameter from 3 to 7 mm. and projecting into the lumen of the intestine. These nodules lie opposite the mesenteric attachment, are scattered through a section of the intestine about 50 cm. in length, and are separated from each other by intervals varying from about 1 to 15 cm. of normal intestine. The nodules are of an opaque white and firm to the touch. The inner surface is covered by mucosa which appears slightly movable over the nodules. On section the nodules appear to be made up of fibrous tissue and contain many punctiform areas of a more opaque white color. Throughout the upper part of the ileum and in the upper part of the colon, there are in the submucosa many small nodules about 1 to 2 mm. in diameter, of an opaque color which are apparently a proliferation of lymphoid follicles.

Mesenteric Glands.—The mesenteric glands appear normal.

Bladder and Prostate.—Appear normal.

Aorta.—Shows a moderate sclerosis.

Anatomical Diagnosis.—Chronic mitral and aortic endocarditis. Cardiac hypertrophy and dilatation. Fatty degeneration of the heart with fibrous myocarditis. Sclerosis of aorta. Congestion and œdema of lungs. Chronic passive congestion of the abdominal organs. Interstitial splenitis. Carcinoma of ileum.

Microscopical Examination.—The heart muscle shows atrophy and hyaline and fatty degeneration of its elements, with diffuse increase in interstitial tissue, accentuated at various points to definite fibrous patches. This is especially marked in the papillary muscles.

The lungs show emphysema with congestion and œdema.

The abdominal viscera show the results of chronic passive congestion.

No organ microscopically shows signs of primary or secondary new growth.

The Tumor Nodules.—The structure of the several nodules of the intestine is essentially the same and a description of one will suffice for all. The smallest nodule was studied in serial sections, the largest in multiple sections by various stains, hæmatoxylin and eosin, Mallory's connective tissue stain, Weigert's elastic tissue stain and Van Gieson's picro-fuchsin. Over the largest nodule the villi are few and are flattened. The epithelium is lacking over the nodule except at one point where there is a slight depression and here it appears normal. The basement membrane of the surface epithelium, however, is intact throughout. Over the greater part of the nodule normal crypts of Lieberkühn are lacking. In their place one finds gland-like spaces filled with cells similar to those in the alveoli throughout the new growth, and from these, slender columns of cells run downward into the mucosa toward the muscularis mucosæ widening in many places into alveoli of considerable size in the mucosa. In one or two places at the edge of the growth similar columns of cells can be traced into direct communication through the basement membrane with the deeper parts of crypts otherwise apparently normal. But a minor part of the new growth is confined to the mucosa. The cells invade the muscularis mucosæ, spread apart its fibres and columns and penetrate it to communicate with the major part of the growth which lies in the submucosa. The tumor consists of a rather dense, cell poor fibrous stroma, in the upper part of which especially, there are fairly numerous smooth muscle fibres apparently derived from the mucsularis mucosæ. The stroma, especially toward the muscular layers of the intestine, shows areas of hyaline degeneration which appear dense and firm and stain deeply with eosin. The hyaline appears often as if deposited in masses of irregular shape and of various sizes. Throughout the stroma are alveoli many of which are of considerable size, and in a single section may appear isolated but are more often in free connection with each other by slender columns of cells. The cellular elements are small polymorphous

cells with scanty clear protoplasm with vesicular nuclei which stain sharply and deeply with hæmatoxylin and which show definite nucleoli. The cells are densely packed together, the outer layer often appearing flattened. They are somewhat shrunken away from the stroma and no stroma fibrils are demonstrable between the cells of the alveoli. The cells and their nuclei are quite uniform in size and staining reaction. Mitotic figures are infrequent. The majority of the alveoli are solidly packed with cells, but a few show a tendency to the formation of a lumen, due to the degeneration of cells at their center. The degenerated cells stain but slightly with eosin, their nuclei also lightly, their protoplasm is granular and their outline indistinct. Other alveoli are penetrated by coarse stroma strands, which in some cases are hyaline. The cells are shrunken away from these, the picture suggesting somewhat a cylindroma. The growth does not extend widely in the submucosa and appears to be limited by the growth of the stroma, which almost encapsulates the tumor. On the outer side, however, the cells invade the muscular layer, at one point penetrating it completely, a small group of cancer cells being found in the subserous tissue. The mucosa in the neighborhood of the growth shows an infiltration with polymorphonuclear cells with eosinophilic granulation but the stroma is free from them. There is no infiltration with small round cells.

The mesenteric lymph-glands show no metastases.

SUMMARY.

In a male negro, aged 52, whose death resulted from cardiac disease and in whom the organs are generally free from signs of a new growth there are found in the middle portion of the ileum six nodules scattered over a length of intestine of about 50 cm. These nodules vary but slightly in size, and are beneath an intact epithelial surface. The nodules are uniformly of a definitely carcinomatous structure histologically, with apparent origin from the epithelium of the crypts of Lieberkühn, show some invasive tendency, but are without metastases in other organs.

There would seem to be three possibilities as to the nature of the nodules:

1. That they were all secondary to carcinoma in some other organ.

2. That one of the nodules was primary, and the others secondary.

3. That they were all primary carcinomatous foci.

The first possibility is definitely excluded by the negative findings in the other organs. There was no primary focus elsewhere. This is further supported by the infrequency with which secondary growths are found in the small intestine except as peritoneal implantations or as direct extension from some adherent new growth. That one of the nodules was primary and the other secondary seems improbable. Metastasis through the vascular channels of the mucosa or submucosa seems excluded by the observation that tumor cells could not be traced to even a microscopical distance to either side of the more or less circumscribed nodules, while in one case, at least, a length of normal intestine of fully 15 cm. lay between two adjacent nodules. Implantation along the serous surface is excluded, as but one of the nodules extended to that surface. Implantation on the mucosa surface, according to the idea of Klebs, would seem perhaps more difficult to exclude. While examples of such implantation are rare, and not all above criticism, this method of extension is one to be considered, and seems the only possible explanation of such cases as the one mentioned by Borst,[6] where a squamous-celled nodule was found in the mucous membrane of the stomach secondary to an epithelioma of the œsophagus, without other metastases. In the present case, however, the nodules seem approximately of the same age. Each one shows an intact basement membrane over it (the epithelial cells having suffered post-mortem desquamation), and what is of more importance, each nodule seems to show histogenic relation to the epithelium of the crypts of Lieberkühn over it. The case then by exclusion and by direct evidence is one of multiple primary carcinomata of the ileum. The case cannot satisfy the criteria of Billroth,[7] for the determination of multiple carcinomata that—

1. The carcinomata must show a different histological structure.

2. That each must be traceable histologically to the epithelium of its matrix.

3. That each must show its own metastases.

The criteria were obviously intended to apply to carcinomata arising in different organs, and the second is the only one applicable in the case under consideration.

That this case is not unparalleled would seem to render it of greater significance. Multiple carcinomata in various organs are considered an accidental occurrence, so might be considered also a single case of multiple carcinomata of the same organ. There are recorded, however, six cases so similar that the description of any one would describe the group except as to very minor details.

The cases in brief are as follows:

1. The first was described by Lubarsch in 1888.[8] In a male, of 49 years of age, there were found in the upper and middle parts of the ileum multiple tumors of a carcinomatous structure lying chiefly in the submucosa but penetrating also the muscularis. The nodule was made up of alveoli and communicating strands of cylindrical and rounded cells with scant protoplasm and with sharply staining vesicular nuclei with from 3-5 nucleoli. The stroma was cell-poor and showed in many places hyaline degeneration, cells at the center of alveoli often showed degenerative changes, which with the apparent grouping of cells about hyaline stroma fibrils gave a picture resembling closely the tumors described as "cylindromata." Lubarsch was able to trace at one point the direct connection of tumor cells with the crypts of Lieberkühn. There were no metastases. The condition was associated with tuberculous ulcers of the intestine.

2. A case also reported by Lubarsch with the above, a man aged 52, in whom were found six carcinomatous nodules in the ileum, corresponding closely in structure with those of the previous case, and where it was also possible to establish a

[6] Die Lehre von den Geschwülsten, vol. II, p. 733.

[7] Allg. Chirurg. Path. u. Therapie, 1889, p. 908.

[8] Virchow's Archiv, 1888, vol. cxi, p. 280.

direct connection between the new growth and the gland epithelium.

3. The case of Notthaft.[9] In a patient dying of pneumonia three nodules were found in the jejunum separated by 10 and 5 cm. of normal intestine. Histologically the nodules were carcinomatous, being made up of alveoli of polymorphous cells in a firm stroma, and in one nodule showing invasion of the muscularis. Direct connection with the glandular epithelium was found. There were no metastases.

4. The case of Walter.[10] A male of 50, dying of pernicious anæmia, showed two cherry-sized nodules in the middle of the ileum, which the author describes briefly as carcinomatous in nature invading the muscularis, showing direct connection with the crypts of Lieberkühn and agreeing in general structure with the cases of Lubarsch and Notthaft. There were no metastases.

5. The case of Oberndorfer,[11] a woman aged 30, dead of typhoid, showed three nodules in a 70 cm. length of intestine, of a similar nature to those above described, and also without metastases.

6. There is possibly to be included a second case of Oberndorfer reported with the above, of a similar nature, where four nodules were found in the middle of the ileum of a woman who had died as a result of chronic tuberculosis. The nodules showed a rather fibrous stroma and alveoli filled with polymorphous cells, but as the author could find no definite connection with the intestinal epithelium, he regarded the tumors as lymphatic endothelial carcinomata.

This series of cases forms thus a distinct group of intestinal carcinomata differing in many particulars from the more common cylindrical-celled adeno-carcinoma of the intestine. The group is characterized by the multiplicity of primary foci, occurring at other than the usual points of predilection of intestinal growths, by the undifferentiated character of the carcinoma cells, by the slight invasive tendency, by the failure to metastasize, and apparently by slow growth. Although several of the cases have been described as beginning carcinoma, it seems more rational to assume a slow growth and a benign course. The patients usually have been well along in the carcinoma age, and in none were the tumors apparently responsible for the death of the patient. No large multiple tumors have been described. Histologically, mitotic figures have been infrequent, and the stroma well developed and fibrous. Further even in serial sections of the smaller nodules it has often been difficult to trace the origin of the tumor from the glands. The cases stand out in sharp contrast to the case of multiple cylindrical-celled adeno-carcinomata of the jejunum and ileum described by Hammer.[12] In a man aged 60 there were four nodules in the small intestine which gave metastases to the mesenteric lymph glands, sixth rib on the right, fifth dorsal vertebra, the dura of the cord and the lungs. Yet one cannot assume that there is anything inherent in the nature of the growths to render them necessarily benign, for a single tumor of the ileum of identical histological structure and with abundant metastases has been described by Ranson.[13] They are, however, of benign tendency and, as far as can be derived from meager histories, produce no severe local or constitutional effects.

The resemblance between this group of tumors and a special group of skin cancers, which has recently received attention at the hands of Krompecher in his monograph "Der Basalzellenkrebs" is striking. Krompecher separates from the ordinary prickle-celled epithelioma, which occurs as a rule at transition points between skin and mucous membrane, as at the lip, which infiltrates and metastasizes early, a group which he terms basal-cell epitheliomata. The latter do not arise at the usual sites but at special points, as the cheek, the forehead, the scalp, grow slowly, infiltrate slightly and almost never metastasize, and are characterized farther by the retention by the cells of an embryonic undifferentiated character. As examples of this type he cites the group of multiple tumors of the scalp, fifteen cases of which have recently been collected by Dubréuilh and Auchè.[14] These tumors have been reported variously, by some as benign epitheliomata, by others as sebaceous adenomata and by still others as endotheliomata. They are always multiple, often existing in great numbers, their growth is indolent, they are superficial, do not invade to any extent and do not metastasize. They may occur as early as the twelfth and as late as the fifty-fourth year. Their duration (to the time reported) varied from 3 to 36 years, with an average of 18 or 19 years. In spite of their number and duration they remain benign and produce no constitutional effect. The authors conclude they arise from the cells of the hair follicles or the sebaceous cysts, but that the connection is early lost. The cells have a different aspect from those of the skin, being polymorphous with a small amount of protoplasm and failing to develop inter-cellular bridges, the characteristic "prickles." They further suggest that in view of the occurrence of such a group the proposition, that as the cells of a tumor approach the embryonic type they gain in malignancy, must be revised.

It is not the intent of this paper to discuss the appropriateness of Krompecher's term, basal-celled carcinomata, for this group of tumors, or the soundness of the wide application of his ideas, so as to include in the same group many tumors which are now considered of endothelial origin. He exempts the gastro-intestinal tract from the list of organs that may furnish basal-celled carcinomata, yet the resemblance between these two series of multiple tumors of intestine and scalp would seem to indicate that they belonged in a general way to a common group.

The recognition of multiple carcinomata from the same epithelial surface can apparently add little to our ideas of the etiology of carcinoma unless it be that the stimulus or im-

[9] Deutsch. Archiv f. Klin. Med., 1895, vol. liv, p. 555.
[10] Arch. für Klin. Chirurgie, 1896, vol. liii, p. 1.
[11] Beiträge zur Path. Anat. u. Alleg. Path., 1901, xxix, p. 519.
[12] Prag. Med. Woch., 1896, vol. xxi, p. 212.
[13] Lancet, 1890, vol. ii, p. 1020.
[14] Annal. de Derm et de Syph., 1902, Series 4, vol. iii, p. 545.

pulse to malignant growth is less focal than is often assumed. It is but a step from the conception of multiple carcinomata to the conception expressed by Hauser,[11] in reference to gastric carcinoma, that "microscopically one can determine that an apparently single diseased focus is composed of a great number of separate groups of carcinomatous glands with groups of normal glands between;" in other words that a carcinoma arises from multiple primary foci closely related. Peterson[12] likewise has demonstrated (unless one incline toward the Ribbert view of secondary upgrowth of carcinoma cells) by wax reconstructions that skin epitheliomata may be multicentric in origin, and further that one finds also multicentric growth, that is by the continual starting of independent centers from the epithelium in the periphery of the tumors. The occurrence of multiple isolated tumors seems to support these views.

In conclusion, I would emphasize:

1. The relative infrequency of carcinoma of the ileum.

2. The occurrence of multiple carcinomata in that location, with epithelial cells of an undifferentiated character, and with generally benign tendencies.

3. The resemblance between this group of intestinal tumors and the group of multiple epitheliomata of the scalp.

Since the completion of the preceding article a second case of multiple carcinoma of the intestine has come to section in the pathological service of the Johns Hopkins Hospital. The case differs materially from the preceding in most of its features, and seems worthy of record for contrast.

The patient, a German, aged 59, was admitted to the medical side, August 22, 1904, with symptoms referable to intestinal obstruction and with a palpable mass in the right iliac fossa. He was transferred to the surgical service, and an exploratory operation revealed an inoperable carcinoma in the cæcal region, and also a second mass in the sigmoid flexure. A palliative ileo-colostomy was made, and at a second operation, as obstructive symptoms persisted, a colostomy. The patient's condition, however, was not relieved and death ensued on August 29. The post mortem examination was made the following day. The detailed description of the organs, other than the intestine, will be omitted. It may be said, however, that there were no lesions of importance save sclerosis of the aortic valves, with calcification, leading to incompetency, sclerosis of the coronary arteries, cardiac hypertrophy and dilatation, and slight chronic passive congestion of viscera. The organs generally were free from metastatic tumor growths.

Intestine.—In the upper part of the ileum there is felt a firm mass which involves the whole circumference of the intestine and invades the mesentery, which is at this point thickened and contracted. On opening the intestine the lumen is found almost obliterated by the tumor growth which encircles it. Opposite the mesentery the tumor forms a rigid, firm band, 2 cm. in width and elevated about 5 mm. above the surrounding mucosa. Toward the mesentery the band divides to form two prominent, firm ridges surrounding a deep crater-like depression, with ulcerated surface and about 15 mm. in diameter. The ridges have a fungating appearance on the surface. The new growth is very firm and on section appears as a translucent fibrous tissue in which are numerous, fine, opaque lines and dots. The growth invades the muscular coat and also the mesentery, at which point it attains a thickness of 2.5 cm. The peritoneum is not involved.

In the cæcal region is a second very similar tumor growth with fungating surface and firm consistency. It involves the ileo-cæcal valves, extends irregularly almost about the cæcal lumen, and invades the retrocæcal tissue. The tumor seems to consist of one main mass, attaining a thickness of 3 cm., and a number of outlying smaller masses connected with it. The cut section is quite like that of the tumor in the ileum.

In the sigmoid is a third tumor, which does not tend to encircle the lumen, but takes the form of a fungating ring lying opposite the attachment of the bowel. The ring is about 5 cm. in diameter; is at its thickest part elevated 1 cm. above the mucosa, and surrounds an ulcerated depressed center 15 x 20 mm. in diameter, which extends practically to the peritoneal coat. The tumor shows less marked stroma growth than the two other foci.

Microscopical Examination.—Section of the ileum tumor shows a typical cylindrical-celled adeno-carcinoma, involving a wide surface area of mucosa, invading submucosa and mucosa, and extending along the vessels and nerves into the mesentery, but not involving the peritoneum. Toward the lumen the growth is made up of large, dilated and tortuous tubules, lined by atypical cylindrical-celled epithelium and with a definite lumen, filled in a few places with necrotic cells. The stroma is here fibrous but rather scant and showing small round-celled infiltration. Toward the outer margin of the growth the alveoli are smaller, in many places showing no lumen, but consisting of a group or short column of a few very atypical epithelial cells. The stroma is increased toward the periphery of the growth.

In the cæcal growth the surface mucosa seems also widely involved; near the surface the growth is of a definite adeno-carcinomatous type like that in the ileum. However, where it breaks through into the retro-cæcal tissue the alveoli are much larger and are in many places almost completely filled by polymorphous epithelial cells, variable in size but as a rule small, with deeply staining nuclei, which also vary much in size and intensity of staining. Many of the alveoli show necrosis at their center. The stroma growth here is also dense and fibrous. Coarse fibrous bands give a gross alveolar appearance. Between the coarse bands there run many finer strands.

The sigmoid tumor shows again a slight variation in type. Large gland-like tubules run downward through the mucosa and submucosa, widening out into large alveoli with ingrowths from their walls, giving them a plexiform appearance. The alveoli are lined by slender columnar cells closely packed together and showing a tendency to heap up, and extend into the lumina, which are filled with mucus and scattered cells. The growth extends somewhat into the muscular coat, but does not involve the peritoneum. The stroma is but slightly developed.

In this case of multiple carcinomata of the cylindrical-celled adeno-carcinomatous type, with ulcerated surfaces, without involvement of the peritoneum, and without metastases in other organs, one does not seem able to say absolutely whether it is a case of multiple primary foci or whether of transplantation of tumor elements from the uppermost tumor and implantation on the mucous surface. Metastasis by lymph or blood channels seems excluded by absence of metastases in other organs and by the fact that in all the

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[11] Virchow's Archiv, 1901, vol. clxiv, p. 165, quoting from his monograph, "Das cylinder Epithel-Carcinom des Magens u. des Dickdarms," Jena, 1890.

[12] Verhandlung d. Deutsch. Path. Gesellschaft, vol. iii, p. 61. Virchow's Arch., 1901, vol. clxiv, p. 570.

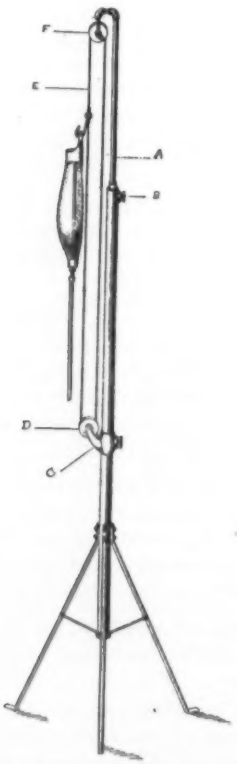
tumors the epithelium of the mucous membrane takes part in the growth. From the extent of growth and stroma development the tumors in the ileum and cæcum seem approximately of the same age, with possibly something to the advantage of the cæcal tumor as the older, while both show greater development than that in the sigmoid flexure. The fact of surface ulceration would lend itself to the transplantation and implantation idea, as would also the occurrence of the second, at the constriction caused by the ileo-cæcal valves. Yet somewhat against the view is the variation in type, slight though it be, shown by the three tumors. And again in the cæcum and sigmoid the new growth does not appear as an implanted metastasis, but the epithelial cells of the tubules of the mucosa take part in the new growth and show a carcinomatous change to as marked a degree as in the tumor of the ileum. Without knowledge of any infecting agent, it would seem that to maintain the implantation idea one must postulate the transfer not only of carcinoma cells but also with them, a carcinomatous tendency which affects the mucosa on which they become implanted. The author leans toward the view in this case that the foci are independent primary foci.

A NEW OFFICE IRRIGATING STAND.

By George Walker, M. D.,

Instructor of Surgery, Johns Hopkins University.

The accompanying illustration is a drawing of an apparatus which I have devised as an office irrigating stand.



Description.—*E* is a continuous cord, and is held between two brass pulleys, *D* and *F*; *D*, the lower one, is fixed so that it does not revolve. The holder, *C*, of the lower pulley, *D*, can be moved up and down so as to tighten the cord *E*, when it becomes slack or when it is desirable to hold a large vessel full of fluid. It also adjusts the cord to different heights of the ceiling. The upper rod *A* can be raised or lowered so as to accommodate the stand to high or low ceilings, the range being about two and a half feet. The screw *B*, holds the rod *A* when adjusted.

The hook on the cord is sufficiently large to hold a fountain syringe or a flat glass irrigator. I have made it longer in some instances so that it supports the ordinary glass percolator.

The advantages of this apparatus are as follows:

1. The bag or glass irrigator can be raised or lowered very easily with one hand.

2. It can be manipulated by the patient without being touched by the operator.

3. A gradually increasing pressure can be obtained without interrupting the irrigation.

I have also made the apparatus with the feet removed, so that it can be screwed to the side of the wall and thus take up less room.

The same principle I have applied to another device in which the upper pulley is fastened to the wall and the lower one held by a similar arrangement as is in the accompanying figure, not being, however, more than one foot in length, thus giving the holder sufficient room to be raised or lowered in order that the cord may be adjusted. This is held three inches from the wall, to which it is attached by means of a board. There is an absence of the upper rod and no connection between the pulleys except by means of the cord.

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CONCERNING A CASE OF SUPPURATIVE MYOSITIS CAUSED BY MICROCOCCUS GONORRHŒÆ (NEISSER.)[1]

BY NORMAN MACLEOD HARRIS, M. B. (TOR.),
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Since the successful culture of the gonococcus by Bumm (1) in 1885, the accumulating evidence of intervening years indicates a now wider area of capability for causing infection than had at first been deemed possible, when it was regarded simply as the specific factor in the etiology of gonorrhœa. To be fully convinced, therefore, of the important position that this organism occupies, one has only to turn to the ample list of references given in the second series of the Index Catalogue of the Surgeon-General's Library (2), and to the very recent and excellent review of the complications of gonorrhœa by von Hoffmann (3).

A careful review of such literature shows that muscular involvements following in the wake of gonorrhœal infection are not of very common clinical occurrence, consisting as they do of atrophies, myalgias and localized inflammations. And it is not the purpose of this paper to enter into a discussion of these clinically interesting phenomena beyond pointing out the rarity of occasions upon which any very definite bacteriological results have been attained in demonstration of the manner in which the latter two phases, at least, are produced.

To the studies of de Christmas (4) we are much indebted for our knowledge of the nature of the toxin of the gonococcus, which is, as he points out, of the intracellular variety and comparatively highly toxic. And from the studies of Wassermann (5), and Gross and Krause (6) of the action of this toxin upon the human subject, it would seem that both arthritic and myalgic pains and swellings and severe constitutional disturbances can be ascribed to it. "It appears, therefore," says von Hoffmann (7), "that the gonotoxin, whatever it may be, when it enters the circulation, causes more or less severe general affections, possibly functional alterations in organs (trophic), as in the kidney and skin, and *also local inflammations;*" but that local inflammations should be wholly ascribed to the action of gonotoxin cannot be with all fulness entertained, as, from the evidence presented in the following, it will appear abundantly clear that the gonococcus itself may be at times the sole active factor concerned.

In chronological order we will now consider those reports which present more or less evidence of the relation of the specific micro-organism to the lesions:

Councilman (8) reports a case of a male patient in the Boston City Hospital, who, following an attack of gonorrhœa, developed arthritis in both knees, shoulders and several fingers, and an acute pericarditis. He died on the tenth day. The autopsy diagnosis was urethritis, acute arthritis, exudative pericarditis and myocarditis involving the left auricle and ventricle. No cultures were made, but microscopic examination showed micrococci in the urethral and arthritic pus, and within leucocytes in the areas of myocardial inflammation, which decolorized by Gram's staining method. None were found in the pericardial exudate.

Budjwid's (9) case was that of a man suffering from a chronic gonorrhœa, who took a chill of a severe sort two days after catheterization, which was repeated several times within the following ten days. Shortly afterwards four abscesses formed and were located in the neighborhood of the left elbow joint, the right popliteal fossa, the inner side of the left leg and over the right external malleolus. "All abscesses were found in the muscles, none in the connective tissues or joints." Cover-slip preparations from the pus, and cultures on serum agar showed micrococci possessing all the characters of Neisser's gonococcus.

Iwanoff (10) reported a case of a woman suffering with gonorrhœal endometritis who died and came to autopsy. A small abscess was found in the wall of the left ventricle, and another in the parenchyma of one of the kidneys. No cultures were made, but a microscopical examination showed the presence of cocci which were believed to be mic. gonorrhœæ.

Servel (11), in a series of eighteen clinical observations, reports three in which investigation was undertaken. In Case X the muscle involved was punctured by a needle and the exuding juice examined in the stained state, yielding doubtful coccus-like bodies. Case XIV, exhibiting muscular involvement, gave on blood culture micrococci which in the absence of the application of Gram's stain were considered doubtful. Case XV, in which the left masseter muscle was swollen to the size of an almond, and on puncture furnished a semi-purulent fluid containing mono- and polymorphonuclear leucocytes, red blood corpuscles and diplococci of good size, which decolorized by Gram. No culture was made.

Ware (12) makes a contribution to the subject, of some interest, in that his patient came to him without giving any history of gonorrhœa, but complaining of severe pain around the right shoulder with inability to use the arm. Physical examination showed a tender indurated area about the size

[1] Read before the Johns Hopkins Medical Society at its meeting on December 15, 1902.

of a walnut in the post-scapular muscles. Local treatment availed nothing, and then on further questioning patient mentioned a previous chronic gonorrhœa, whilst his urine showed still a few threads containing typical gonococci. On cutting into the indurated area no pus was found, a bloody fluid only came away. Not suspecting gonococci, cultures were made on ordinary media at hand with entirely negative results, yet cover-slips showed micrococci decolorizing by Gram.

Turning now to our own case: A. C., female, aged 34 years, married, was admitted to Dr. Osler's service in Ward G on July 3, 1902, complaining of stomach trouble. *Family history* was excellent. *Past history* showed that she had had measles, whooping-cough, and, 12 years previously, typhoid fever. She never had rheumatism, tonsillitis, pneumonia, pleurisy, scarlet fever or malaria. *Marital condition:* Has been married 13 years, has four children, all living and well, no miscarriages. Menstruation began at 19 years, and has always been regular. Patient has had leucorrhœa for years, and since the birth of the last child eleven months ago has had no menses, but has been troubled with "the whites." She nursed her baby until three days ago. *Present illness:* Aside from the characteristic symptoms of a chronic dyspepsia of a year's standing, the patient says that four weeks ago a lump appeared in the calf of her right leg about the size of a hen's egg; this has now gone, only a diffuse swelling remaining. The lump was painful, as is the swelling now. There is no pain in the neighboring joint. *Physical examination* (in so far as it relates to our theme): Back—At the junction of the sacral and lumbar regions is a swelling which the patient says has been there for four months; it is about the size of a hen's egg. Legs—The patient holds her right leg semi-flexed, the calf seemingly very much swollen. Thirteen cm. below the lower border of the patella the right leg measures 34 cm., the left leg at a corresponding point 28.5 cm. Just below the tibial tubercle the right leg measures 29 cm., the left 25.5 cm. No difference is found in the measurements at the ankles. Glandular system—The submaxillary glands are enlarged, as are those of the anterior cervical triangles, of the right posterior and part those of the left posterior triangles; they are freely movable. There is no enlargement of the axillary, epitrochlear and inguinal glands. Hæmoglobin, 64 per cent. Leucocytes, 16,000.

Note by Dr. McCrae.—The patient looks rather emaciated, skin sallow, no jaundice. Gums and mucous membrane rather pale; tongue moderately coated. There is slight flexion of the right knee, which can be readily overcome by pressure, and the leg flattened. There is marked swelling of the calf of right leg, which has a boggy fluctuating feeling (measurements as before). At the lower end of this swelling is a pigmented area which the patient says has been there since last winter. The region is very tender. There is no evidence of involvement of the bones. Knee-jerks present on both sides. There exists marked enlargement of the glands of the neck, which are discrete and shotty. Over the sacrum is a boggy swelling which is very tender, yet the skin over it is not red. Considerable tenderness exists over the spines of the lumbar vertebræ. There is no definite lateral curvature of the spine.

July 4—Red blood corpuscles, 3,648,000.

July 7—A large hypodermic needle was inserted into the swelling of the calf of right leg and a small quantity of pus obtained on aspiration. Urine examination showed no abnormal state.

Medical Bacteriological Report.—July 6—The Gruber-Widal test for typhoid fever proved negative. July 7—Examination of the pus aspirated from right leg showed it to have a cream-like consistence and to be mixed with considerable blood.

Cover-slip preparations stained in methylene blue and gentian violet presented a moderate number of single cocci and diplococci outside of the leucocytes, all staining well, and decolorizing by Gram.

Cultures.—The major portion of pus was put into a flask of bouillon and well mixed; the smaller portion was smeared over the surface of a plain agar tube, and all were incubated at 37° C. July 10—The flask culture shows no growth in the supernatant fluid, nor any definite growth at the bottom, yet cover-slips made from the subsided pus demonstrate a very decided increase in micro-organisms, which are found singly, in pairs, in fours, and in clusters, and varying considerably in staining properties. An unstained zone surrounds quite a number, as if possessed of a capsule. When stained by Gram the vast majority are quite decolorized, a very few retaining the dye in a moderate degree. The agar tube previously smeared with some of the bloody pus presents eight small, round, gray, translucent, moist, smooth, glossy colonies, varying in diameter from 0.5 to 1.0 mm. Their morphological and tinctorial characters correspond to those in the flask culture. The contents of both flask and tube were now plated out in hydrocele-fluid agar, and also smeared over the surfaces of several tubes of the same medium.

July 12—Having been 48 hours in the incubator at 37° C., the plates exhibited in seemingly pure culture numerous small, round, grayish colonies, like those of *streptococcus pyogenes.* Examined under the low power of the microscope the surface colonies were round, edges regular, of a straw-yellow color, moderately granular, occasionally nucleated, all translucent; the deep colonies were round or irregular in shape, of a light brown-yellow color, rather coarsely granular, edges at times irregular, all translucent. Both surface and deep colonies when touched with the platinum needle were found to have a definite degree of viscosity, so much so that at times the whole colony would adhere to the needle; and on making cover-slip preparations with water considerable difficulty was experienced in spreading the film owing to this viscid quality. The organisms from these colonies were micrococci exhibiting much variation both in size and stainable qualities, some cocci scarcely imbibing any stain at all; they were found to be grouped singly, in pairs, in fours, and in clusters of irregular size. They decolorized completely by Gram's method. Transfers were made to Loeffler's blood-serum, plain agar, bouillon, potato, etc., and to hydrocele agar, and incubated.

July 15—Growth only on hydrocele agar. No animal inoculations were made.

Diagnosis.—*Micrococcus gonorrhœæ.*

July 8, 1902—Operation by Dr. Follis.

(1) *Incision and drainage of abscess over sacral region, probably intramuscular.* An incision was made excising a portion of the skin over the abscess just above the sacrum. The abscess ran up into the erector spinæ muscles on both sides. There was considerable sloughing of the muscles, especially above their attachments to the pelvis. The abscess was thoroughly cleaned out and after about three ounces of pus had been evacuated it was swabbed with pure carbolic acid and alcohol and packed with iodoform gauze.

(2) *Incision and drainage of intramuscular abscess of the calf of the right leg.* An incision was made just behind the fibula on the right side. This was carried down through the skin and subcutaneous tissue and a large abscess which contained about one and a half pints of blood-stained pus was opened into and evacuated. The abscess was under the gastrocnemius and soleus muscles extending up into the popliteal space. There was considerable sloughing of these muscles and their tendons. A counter incision was made on the inner side of the leg, the abscess swabbed with carbolic acid and alcohol and packed with iodoform gauze.

The patient's temperature, which had ranged from normal in the morning to 102° in the evening, returned to normal on the third day after the operation and remained down during the 40 days' time that the large wounds required for healing.

Surgical Bacteriological Report.—A culture in bouillon was sent to the laboratory from the operating room, also a smear of pus. This smear contained both intra- and extracellular diplococci arranged in groups which decolorized by Gram's method of staining. Sub-cultures from bouillon on plain agar failed to produce any growth; on a hydrocele agar slant numerous small, gray, round colonies appeared in twenty-four hours. Smears from the growth on hydrocele agar contained diplococci arranged in short chains and groups which decolorized by Gram's method of staining. There was no growth in milk, bouillon, or on potato from cultures made from the hydrocele agar tube.

DIAGNOSIS.—*Micrococcus gonorrhœæ.*

In view of the bacteriological findings the patient was, during convalescence, particularly questioned in hopes of eliciting evidence of symptoms pointing to a gonorrhœal infection, but beyond the knowledge of a leucorrhœa of long standing and occasional attacks of pain and sensations of burning while passing urine, nothing of a definite nature could be obtained. To exclude the possibility of the muscular condition being secondary to joint or tendon-sheath infection, the patient most positively stated that at no time did she notice any trouble in or about her joints or tendons, the trouble appearing directly in the regions affected, namely, in the calf of the leg and the muscles of the back.

Reviewing now the foregoing cases quoted from the literature, bearing upon our own, it will appear evident that from lack of cultural proof those cases reported by Councilman, Iwanoff and Servel can be only tentatively regarded as gonococcal in nature, whilst that of Ware may, without being hypercritical, be regarded as positive, inasmuch as he furnished negative cultural evidence in support of his microscopic findings. In quoting Budjwid's case in this connection, it is simply to call attention to the serious discrepancy between his assertions and his facts, for it is certainly imposing upon one's credulity to say that muscular abscesses can have existence in the anatomical regions he so clearly describes; his case cannot well be other than extension of the suppurative processes from the joints and tendon sheaths.

Summing up the evidence thus presented, it is proven that amongst other tissues of the body, the muscles can be the seat of secondary inflammatory metamorphoses occurring in the course of a gonorrhœal infection, caused on the one hand by the action of the intracellular toxins absorbed by the blood, and, on the other, by the direct implantation and action of the gonococci themselves, wherein may be found all grades of severity, from that of an early resolving, painful induration to such an extensive degree of suppuration and necrosis as was furnished by our case. From what we know, also, of the frequency of metastatic complications attendant on gonorrhœa, it would seem fair to assume that the chances are equal that the gonococci are quite as much concerned in these lesions as are the absorbed toxins. This assumption, however, can only be made good by the records of further investigation.

In conclusion, we desire to express our cordial thanks to Doctors Osler and Halsted for their permission to make use of the history of this case.

NOTE.—Within the interval between the presentation and publication of this article, Thos. J. Strong, M. D., reports in the *Journal of the American Medical Association*, 1904, May 14, p. 1288, a case under the title, "General Systemic Infection by the Diplococcus of Neisser Complicating Gonorrhœa," wherein muscular involvement was a prominent symptom. The case rests, however, on too meagre and doubtful bacteriological grounds to make it at all convincing.

N. MACL. H.
L. W. H., JR.

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BACTERIUM CYANEUM: A NEW CHROMOGENIC ORGANISM.[1]

By Ethel L. Leonard, M. D.,

City Bacteriologist, and Assistant in the Hendrix Laboratory, Los Angeles, California.

This interesting micro-organism was discovered on several occasions in air-plates made in the Hendrix Laboratory by the students of the University of Southern California during the years 1900 and 1901, and, although searched for since, it has not been again encountered. The colonies attracted special attention on account of the deep blue pigment which was seen in the medium immediately around them; pure cultures were at once obtained from them and placed in our collection of bacteria in the Medical School for future observation.

The study of the organism has been unfortunately interrupted many times since the period of its isolation, but as opportunity offered systematic work has been done in our own laboratory and that of the Johns Hopkins University and Hospital.

A careful review of the literature and of the leading systematic treatises on bacteriology fails to show any organism whose description at all fits in with the cultural and biological features of this bacterium excepting Ps. syncyanea and Ps. cyaneo-fluorescens, from which it can be distinguished readily enough by certain well-marked characteristics (*vide infra*), and it is, therefore, with some confidence that I venture to present it as a new and distinct chromogenic organism, under the name of *Bacterium cyaneum*, adopting the binominal nomenclature of Migula.

The organism has little to commend it beyond its very striking production of blue pigment, yet for this very reason I was largely induced to publish an account of it, as it undoubtedly will fill a necessary place in the teaching of some of the elementary points in the subject of bacteriology.

The plan followed for the description is that recommended by the Bacteriological Committee of the American Public Health Association, published in 1898.

Bacterium cyaneum is a non-pathogenic, chromogenic organism, 1 to 2.5 microns in length, .7 microns in thickness. The forms seen in young bouillon cultures 24 to 36 hours old are the longest, being 2.5 and even 3 microns long, whilst those on fully developed agar or gelatine cultures measure from 1 to 1.5 microns in length. The organism is non-motile, and has in many specimens characteristic small clumps of bacteria which appear attached by their ends. They are also grouped in pairs at obtuse angles. The bacillus contains refractile, deeply staining granules which may be at either one or both ends, or situated in the body of the bacillus. Plasmolysis is often noticed in young cultures.

No spores, capsules or flagella have been demonstrated.

Bacterium cyaneum stains well in the ordinary aniline dyes, recommended by the Committee, namely, 5 per cent fuchsin, gentian violet, methylene blue and Loeffler's methylene blue. Some difficulty was experienced in obtaining well-stained specimens on account of the large amount of zooglœar material present.

After fixation the films should be washed in .5 per cent acetic acid solution before staining. Most satisfactory stains are obtained by the use of 5 per cent fuchsin or gentian violet. A 5 per cent solution of thionin demonstrates the granules, showing a marked differentiation between the deeply staining bodies and the more lightly stained protoplasm of the bacillus.

All stained specimens show small coccus-like bacilli; 1 micron long and 7/10 microns broad. These have no characteristic arrangement. Longer forms, however, 1.5 to 2.5 microns long, are found, sometimes irregular in form and clumped together in small groups. Others form the characteristic obtuse angles. In fully developed cultures on gelatin, agar and potato, the bacillus is about 1 micron long and has no typical arrangement.

Specimens are easily decolorized in weak acids, or alcohol, but are not decolorized by Gram's method of staining. The morphological characteristics in old cultures are essentially the same as detailed above, with an absence of the longer forms, and the presence of many swollen, lightly staining coccus-like types.

Bacterium cyaneum grows best at room temperature; grows well, but will not form pigment at 37 degrees C. Development takes place slowly at 15 degrees C., and at 10 degrees C. no growth occurs. A temperature of 68 degrees C. with an exposure of five minutes to moist heat destroys the life of the organism. Forty-eight hours' old broth cultures were used for this test. No growth takes place under anærobic conditions. (Test used, mica plate and fermentation tubes.)

Colonies on agar plates 24 hours old at 37 degrees C. are coarsely granular and greenish yellow in color. Many have nuclei; 48 to 72-hour colonies show three distinct zones; a nucleus in the middle, most externally a thin, coarsely granular, irregular edge, occupying about one-third of the colony, and between these two portions is a dense granular, greenish-yellow zone. In those colonies developing at room temperature, many fine, irregular, blue granules occur through the central portion of the colony. The surrounding medium is sometimes lightly tinged with blue.

Those colonies developing at 37 degrees C. do not show these irregular blue granules, which I believe to be the pigment formed by the organism. Superficial colonies 2 to 3 weeks old, show dappling with the blue granules scattered throughout the entire colony. Deep colonies on agar are lenticular or round, and on plates two or three weeks old, bosses are sometimes observed.

[1] Read before the California State Medical Society, May 19-21, 1904, at Paso Robles, Cal.

Those deep colonies which penetrate the medium and become superficial have a characteristic appearance on agar plates. The surface portion of the colony spreads out in a fan-shaped manner, terminating in a thin translucent edge and the deeper portion of the colony might be likened to the handle of a fan which appears massed together in a cylindrical form at one side of the colony.

On a gelatine plate 24 hours old, the colonies are small, granular, browinsh-yellow and have circumscribed edges. The medium is unchanged, but liquefaction begins after 48 hours' growth and the gelatine is completely liquefied in from three to four days. The medium is slightly greenish-yellow. Deep colonies are lenticular or round, very small and granular.

moist, elevated growth. The development on potato is exceedingly slow and cultures one month old are often the most typical. The presence of moisture favors the development of the pigment.

Gelatin Stab.—Liquefaction of gelatin begins about the fifth day and may be napiform or transverse, the surface becoming liquified first and proceeding outwards and downwards in an even manner. In 10 per cent glucose gelatin, the entire medium becomes pigmented a deep blue before liquefaction begins.

On Loeffler's blood serum medium after 24 hours appears a growth with a yellowish-green color; it is elevated, moist and vigorous. After twenty-four hours further a slight blue color appears at the upper portion of the medium, especially if

Bact. cyaneum.	*Ps. cyanco-fluorescens.*	*Ps. syncyanea.*
Morph.:—Bacilli, for the most part coccoid, 1 to 2.5 μ long, 0.7 μ wide—well defined rods not abundant. No spores. No flagella.	Short, thick bacilli, about 2 μ long and 1 μ wide. No spores. Bipolar flagella.	Bacilli, 2 to 4 μ long, 0.7 μ wide. Oval polar spores. Polar flagella.
Motility:—Non-motile.	Actively motile.	Actively motile.
Gram:—Positive.	(Not mentioned.)	Negative.
Gelatin:—Liquefied.	Not liquefied.	Not liquefied.
Milk (plain):—Peptonization without coagulation. No pigment formed.	Apparently unchanged, but addition of alkali produces a Berlin blue color.	May or may not take on a sky-blue color; addition of weak acid produces the blue pigment. No other change apparent.
Litmus Milk:—Slightly alkaline reaction. Peptonization without coagulation.	(Not mentioned).	Strong alkaline reaction. No peptonization or coagulation.
Potato:—Slow, moderate, yellowish, moist growth. A deep blue pigment slowly diffuses through medium after 8–14 days, beginning where medium is dry.	A vigorous, yellow-gray, moist, growth, turning to a muddy gray-blue. Medium slowly stained a brown-gray, or dark bluish-gray.	Similar to Ps. cyaneo-fluorescens, occasionally a little blue-black staining of medium close to growth.
Glucose Agar:—Surface growth at first yellowish-green, later has a gray-blue tint. Medium progressively and wholly colored a deep blue, altering later to brownish blue.	(Not mentioned).	Surface growth at first of neutral tint, turns a gray-blue. The upper $\frac{1}{4}$ of medium stains a blue-brown, changing often to a blue-black.
Pigment:—Deep blue with a violet cast. Readily soluble in water; slightly in alcohol; insoluble in ether and chloroform.	Brownish-blue. Insoluble in water, alcohol, ether, and chloroform.	Pigment composed of a fluorescent substance, and a body of a steel-blue or brownish-blue color. Both are soluble in water—(alcohol, ether, etc. ?).
Temperature:—Grows well at room-temperature and at 37° C.	Grows well at room-temperature and between 25–30° C.	Grows best at room-temperature, not at all at 37° C.

Litmus milk shows no change after growth for 24 to 36 hours. At 48 hours, the milk becomes more alkaline with a light green cream-ring, and showing no coagulation or peptonization. At the fourth or fifth day of its growth the blue color of the milk has completely disappeared and the peptonization without coagulation has taken place with a reaction seemingly neutral. The organism forms a blue precipitate at the bottom of the tube, which becomes a bright yellow a day or two later. The cream ring is deep blue even after eighteen days' growth.

Potato.—No growth takes place on potato until about the third or fourth day, when a small blue spot is noted in the medium, which slowly increases and permeates the potato. The surface growth then becomes visible as a greenish-yellow, somewhat dessicated. After a week's growth the serum becomes liquefied and of an olive green color.

Growth on coagulated pleuritic fluid has about the same characteristics, but liquefaction begins about the fourth day.

Fermentation tests in dextrose-free bouillon show no gas formation, nor is gas formed in any sugar solution. In the bulb of the tube a green flocculent precipitate is present.

Experimental work on the pathogenic properties of *Bacterium cyaneum* have been negative thus far. Frogs and small guinea-pigs show no lesions after inoculation.

The pigment produced by *Bacterium cyaneum* is deep blue in color and non-crystalline, and seemingly has no intimate connection with the bacterial cell. It is soluble most readily in water, slightly so in alcohol, and insoluble in ether and

chloroform. The pigment develops best at room temperature, also very slowly at 15 degrees C., but at 37 degrees C. no pigment formation takes place.

The power of forming pigment is not lost by growth at brood-oven temperature, however, as such a culture, even after growth for a week in the brood-oven, will regain its characteristic blue color if placed at room-temperature for 36 to 48 hours, either in the light or dark.

After a growth of from 18 to 24 hours all young cultures on solid media, agar and gelatin, show a pale green color in the surface growth, but no color in the medium. From 24 to 36 hours a purple color is present in the medium immediately below the growth; this gradually deepens to form the dark blue, which in four or five days diffuses throughout the entire medium. During this time the surface growth gradually assumes the same deep blue color. After two or three weeks, or less, the surface growth has become a chrome yellow, and the blue pigmentation of the medium loses its brilliant color and assumes a dull blue, and finally a wine color. This gradually fades in two or three months to a reddish brown, possibly due to oxidation.

Experiments on the various sugar media, glucose, lactose, sucrose and maltose, proved these to be of most value in the demonstration of the pigment. On 10 per cent glucose or maltose agar the pigmentation is more brilliant than on lactose or saccharose, although these two latter media show more pigment formation than is seen in those media not containing sugar.

Twenty-four-hour-old cultures on 10 per cent glucose or maltose agar present a vigorous, moist, pale green surface growth, with beginning blue color in the medium. This pigmentation rapidly extends until the entire medium is infiltrated. After a week or ten days the medium fades and becomes reddish, and later brownish-red with a yellow surface growth.

By reflected light the pigmentation appears wine color, and it seems probable that there are two pigments present, a blue and a red.

The chemistry and spectroscopy of this pigment will form the basis for future work.

Differentiation.—Apparently the only two organisms with which Bact. cyaneum might be confounded are Pseudomonas cyaneo-fluorescens (Zangemeister) Mig., and Pseudomonas syncyanea (Ehrenberg) Mig. A study of the table of comparison on preceding page will show several well-marked points of distinction.

My hearty thanks are due to Dr. Stanley P. Black, of Pasadena, Cal., for many helpful suggestions in the course of the investigation, and to Dr. Norman MacL. Harris for encouragement and assistance at several stages of the work.

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NOTES ON NEW BOOKS.

A Laboratory Text-book of Embryology. By CHARLES SEDGWICK MINOT, LL. D. (Yale), D. Sc. (Oxford), Professor of Histology and Embryology in the Harvard Medical School. With 218 illustrations, chiefly original. (*Philadelphia, U. S. A.: P. Blakiston's Son & Co.*)

This new laboratory text-book of embryology is worthy of particular attention. It is a practical guide of a novel and original type, which is to be recommended as a valuable aid in laboratory teaching of a difficult nature. The volume is planned to help the student secure a first hand knowledge of mammalian embryology from the examination of specimens, by placing before him a few well selected stages and directing him in their detailed study. The idea is thus to give a real basis for an understanding of human embryology and anatomy, and this is attempted in the latter half of the book, beginning with chapter IV which contains the directions for practical laboratory work.

Prof. Minot outlines the plan on page 173, as follows: "A pig embryo of 12 millimeters has been selected as the center of study in this book because its anatomical relations are such that they may be readily grasped by the student who has already studied the anatomy of an adult mammal, human or other. At the same time the development of the organs is so far advanced that their fundamental relations may be observed. From an embryo of this size the transition to the study of other embryos is, even for the beginner, comparatively easy."

The 112 pages of chapter IV devoted to the examination of pig embryos form the original and the most novel departure in the work. The illustrations of the surface views, reconstructions, and microtome sections of the 12 millimeter pig embryo are carefully chosen, numerous, and exceptionally well executed; while the text contains an excellent and very full description of all noteworthy characters. Taking the 12 millimeter stage as a standard for reference, younger and older embryos are compared with it to explain the important changes which take place, while many accurate original figures of actual sections accompany the descriptive text. A feature of the treatment here is the skillful method of giving general information in connection with the description of special objects. With the aid of this portion of the book and a few specimens of young pig embryos, easily obtained,[1] a student, who is also provided with selected microscopic sections through the various regions of the bodies of a series of embryos of different ages, and who is acquainted with the elements of the anatomy of some mammal or of man, can readily become familiar with the main facts of development. If too great bulk could be avoided, a still further extension of the treatment accorded the 12 mm. pig to a few other stages would be well worth while.

In the next chapter, chapter V, very young chick embryos (first and second day) are selected to illustrate the earlier embryonic stages, leading up to the stages of the pig already studied. These early specimens are not readily secured in the case of the pig or other mammals, hence the chick embryos form a valuable substi-

[1] Ready prepared embryos may be had by applying to The Preparation Department of the Biological Laboratory, Tufts College, Mass.

tute. This matter takes up about 50 pages, and the book is concluded with a few essentials of technique and the section of 40 pages on the Uterus, Placenta, Membranes, etc., in which human material is to be studied as a special preparation for work in obstetrics.

Of the remaining part of the book, the first half is descriptive and general, and the matter included in it forms a supplement to the practical sections. It is sufficiently clear from the title that a systematic descriptive account of the development of the organs is not attempted. The student is referred to text-books of a different type for such an account. The topics here treated fall under the following heads: "A description of the germ-cells," "fertilization," "segmentation," the "germ-layers," "the development of the blood," "the first appearance of the vessels and the heart," etc.; as well as a brief review of the developmental history of the human embryo from its earliest stages up to a period of four months.

Chapter I of the book, which contains a statement of important general principles and fundamental facts underlying embryology, forms an excellent introduction and is a desirable addition to the practical chapters. The remainder of the first half of the volume, chapters II and III, is of evident value, though it includes subjects not falling exactly within the scope of practical laboratory study. On the whole, however, one would wish to see these sections retained in a revision, though, perhaps, some recasting may be advisable, to avoid repetition of topics already treated in other parts of the book in connection with the practical study of specimens. It would seem best to place most of such general and descriptive matter in an appendix at the end of the work.

This new laboratory text-book is a valuable addition to the list of available text-books of embryology. In fact, the book stands by itself and is an original departure in a very desirable direction, introducing the student to the subject by a practical method which promises excellent results. After a year's experience with it, we feel much confidence in its success.

H. McE. K.

Hand-book of the Anatomy and Diseases of the Eye and Ear. For Students and Practitioners. By D. B. ST. JOHN ROOSA, M. D., LL. D., Professor of Diseases of the Eye and Ear in the New York Post-graduate Medical School; and A. EDWARD DAVIS, A. M., M. D., Professor of Diseases of the Eye in the New York Post-graduate Medical School. 300 pages, square, 12 mo. (*Philadelphia, Pa.: F. A. Davis Company, Publishers.*)

The authors state in the preface that "the present volume exhibits the present state of Ophthalmology and Otology in sufficient proportions to make an exact and reliable guide as to the principles of treatment of the diseases of the Eye and Ear, and to the anatomy of these organs." We cannot substantiate this view, and the beautiful babe in the eyes of the parent shows itself to us as an ugly duckling. The anatomy is too much abbreviated to be of service, but covers enough space to show a number of errors. On page 200 the authors speak of the auricle being attached to the *malar* and temporal bones. At another place they speak of the optic nerves having their *origin* in the thalami, etc. The cornea is not a highly polished membrane. We think an error of judgment is shown when small measurements are given with the inch as a unit instead of the millimeter. The authors use the following measurements: 1/20, 1/60, 3/2500, 1/28, 3/25, 7/50, etc., of an inch.

In giving the etiology of the various diseases of the eye and ear unimportant or doubtful factors are in many cases stated first and the essential factors entirely ignored. For instance, in iritis, injuries and *cold* (?) are mentioned before the important factors of syphilis and rheumatism, etc. The same occurs in reference to retinitis, when exposed to bright light and continued occupation in fine work are given first. Diabetes as a factor is entirely ignored and the authors discuss the subject as if every retinitis had the same pathological picture. What little pathology the book contains is faulty. Chalazion is attributed to an obstruction of the Meibomian duct. No mention is made of the part played by the xerosis bacillus in setting up an inflammation of the gland. The reader is led to believe that the increase of intra-ocular fluids causes glaucoma. We confess we do not understand the following sentence which occurs in the ear section, p. 277: "If a chronic suppuration is advancing and cannot be kept in an aseptic condition an operation is indicated." Trachoma is said to be a result of catarrhal, purulent or diphtheritic conjunctivitis. We cannot see the purpose of the authors in differentiating a purulent conjunctivitis, which they say is due to the gonococcus, from a gonorrhœal conjunctivitis. On page 96 the authors state that the exophthalmos of exophthalmic goitre disappears when treatment is directed to the *cardiac* disease (?).

In regard to treatment, no mention is made of the value of anti-diphtheritic serum in diphtheritic conjunctivitis, or of boracic acid in aspergillus of the auditory canal. We do not approve of opening a chalazion through the skin of the lid. In regard to "mastoid affections," on page 271, we read that mastoid periostitis often arises in suppuration of the middle ear and the authors advise an incision of the tissues down to the bone. This is very bad surgery which has properly fallen into disrepute, for we now know that practically every case requiring this incision will have associated with it some suppurative foci in the mastoid cells, antrum, attic, etc., and a simple incision through the superficial tissues will not clean these out.

The general arrangement of subject matter is not good and too much space is given to at least two conditions which do not exist as clinical entities, viz.: Epilepsy of the retina and chronic proliferous inflammation of the middle ear (ROOSA).

As an example of the very careless way in which the book has been written we will mention the fact that on page 37, in describing the anatomy of the lachrimal ducts, the direction is given as downwards, outwards and *backwards*, which is correct, and yet in passing the probes it is stated they should be passed downwards, outwards and *forwards*.

The various refractive errors of the eye are discussed in such a fragmentary way as to be entirely devoid of worth.

B. B. B., JR.

How to Cook for the Sick and Convalescent. Arranged for the physician, trained nurse and home use. By HELENA V. SACHSE. 2nd edition, revised and enlarged. (*Philadelphia: J. B. Lippincott Company, 1904.*)

This little volume opens with a most valuable classification of recipes according to composition, food value and character of the food materials. It contains also some helpful, though brief points on the preparation of the tray for the invalid. Aside from this, the book consists almost entirely of recipes which do not differ in any notable respect from those previously published. Being individual recipes, however, they are particularly valuable to the nurse who prepares the food for her patient.

The chapter on home modification of milk is of small practical value since the subject is so little understood by the average woman, and because the process requires more time than can be devoted to it in most homes.

M. H. J.

A Manual of Clinical Diagnosis. By CHARLES E. SIMON, M. D. Fifth edition, thoroughly revised and enlarged. (*Philadelphia and New York: Lea Brothers & Co., 1904.*)

This work has been much enlarged in this edition by the addition of the recent work on this subject, with many new illustrations. The book is a very complete one.

The Students Handbook of Surgical Operations. By Sir Frederick Treves, Bart, K. C. V. O., C. B., LL. D., F. R. C. S., Sergeant Surgeon-in-Ordinary to the King, etc., Consulting Surgeon to the London Hospital. New edition, revised by the author and Jonathan Hutchinson, Jun., F. R. C. S., Surgeon to the London Hospital, etc. 486 pages. 121 illustrations. Abridged from the last edition of the author's "Manual of Operative Surgery." (*Chicago: W. T. Keener & Co., 1904.*)

This handbook, as the author states in the preface, "concerns itself only with the most essential and the most commonly performed operations. All matters save such as deal with the actual technical details of Operative Surgery have been omitted. The General Principles of Operative Surgery or the consideration of the value of the various methods are not taken up."

More than half the book is given up to the various ligations, amputations and excisions, which are considered quite at length, while the operations on the abdomen, hernia, bladder, etc., etc., are concisely described for the most part.

There is no reference made to the surgery of the thorax, and several essential and important major operations commonly performed in this country are not mentioned.

Lists of the instruments required are given for each operation, which is a convenience for the student.

The illustrations are nearly all diagramatic and aid considerably in following the text.

The work is primarily intended for students who are preparing for their final examinations, or for those who need a book to assist them in carrying out operations on the cadaver. It is nicely gotten up, with flexible binding, is of convenient size and, on the whole, seems suitable for the part it is intended to play.

Refraction and How to Refract, including sections on optics, retinoscopy, the fitting of spectacles and eye-glasses, etc. By James Thorington, A. M., M. D., Professor of Diseases of the Eye in the Philadelphia Polyclinic, etc. Third edition. 215 illustrations. (*Philadelphia: P. Blackiston's Son & Co., 1904.*)

This is the 3rd edtion of Thorington's book on refraction. Very few changes are noted in this edition in subject matter, general arrangement or additions. The definitions of the various terms used in optics and refraction are good. The book, however, is too dogmatic, some important facts are not explained and some of the explanations when given are faulty. To illustrate, we quote the following from the author: "Each vessel in the eye-ground of an astigmatic (?) eye is seen clearest through the meridian at right angles to its course. This is a puzzle to the beginner but he must remember that cylinders refract opposite to their axes" (page 153). We do not consider this an explanation to the puzzled student.

The book retains a number of puerile statements, such as "Eyes in which the myopia is progressive are spoken of as *sick eyes*" (p. 115), and when one of the ways of quickly diagnosing simulates myopia in hypermetropia is given as (page 111) "The fact that very few children have myopia," which is not very conclusive. The ophthalmoscope is not of value in diagnosing this condition, as the author suggests.

In regard to correcting muscle errors, no mention is made of the importance of *fully* correcting the hypermetropia in esophoria and undercorrecting it in exophoria.

If one's entire knowledge of "Refraction and How to Refract" had to be obtained from this book, it is to be feared that he would have a very imperfect understanding of an important branch of ophthalmology.

B. B. B., Jr.

A System of Practical Surgery. By Prof. E. von Bergmann, Prof. P. von Bruns and Prof. J. von Mikulicz. Vol. IV. Translated and edited by William T. Bull, M. D., Professor of Surgery, Columbia University, New York, and others. Surgery of the Alimentary Tract. (*New York and Philadelphia: Lea Brothers & Co., 1904.*)

This volume contains 739 pages. It deals with the surgery of the alimentary tract, and includes the chapter on the surgery of the œsophagus and the chapter on hernia, which appeared in Volumes II and III, respectively, of the second German edition.

The criticism of Volume II, which appeared in the Bulletin for September, 1904, is equally applicable to this volume. The book is essentially an Americanized edition, which, sad to relate, has lost somewhat of the dignity of the original. More attention is devoted to the operative side of the subject, while many important passages are omitted. The passages in fine print, which appear in the original and which contain a great deal of valuable information, are lost. With the above exceptions, the translation adheres closely to the German text, but is only moderately well done, the sense at times being rather obscure.

The references to the literature have been entirely omitted. The best chapters are probably those on the œsophagus by von Hacker, and those on the surgery of the stomach by Mikulicz.

The volume, however, will give those who do not read German a fair idea of the value and completeness of the original.

Beauty Through Hygiene. Common Sense Ways to Health for Girls. Illustrated. By Emma E. Walker, M. D. (*New York: A. S. Barnes & Co., 1904.*)

This sensible, well-written little volume is one of a series entitled the "Womans Home Library." It is designed to teach girls how to secure and to maintain good health. The chapters on "Deep Breathing," "Exercise for Healthy Girls," and "Bathing," are to be especially commended. The book is written with delicacy and good taste and is fit for a young girl to read. It has an excellent index.

INDEX TO VOLUME XV OF THE JOHNS HOPKINS HOSPITAL BULLETIN.

Amaurotic family idiocy, case of, 94.
Aneurism of thoracic aorta, 57.
Aneurysms, multiple saccular, of the aorta with rupture into the pericardium, two cases of, 170.
Anopheles mosquito which does not transmit malaria, 53.
Appendices vermiformes showing unusual pathological conditions, exhibition of, 136.
Arteritis, typhoid, case of, 60.
Arthritis deformans, exhibition of case, 257.
Bacterium cyaneum: A new chromogenic organism,
Bean, R. B., Observations on a study of the subclavian artery in man, 203.
Biography of Stephen Hales, D. D., F. R. S., 185.
Blood in pregnancy, 205.
Blood pressure studies in, 179.
Bloodgood, J. C., An early case of ulcer of the stomach, 345.
Books received, 106, 300, 344, 377.
Brooke, Dr. Richard, the first scientific observer in Maryland, 294.
Bunting, C. H., Multiple primary carcinomata of the ileum, 389.

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